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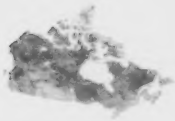

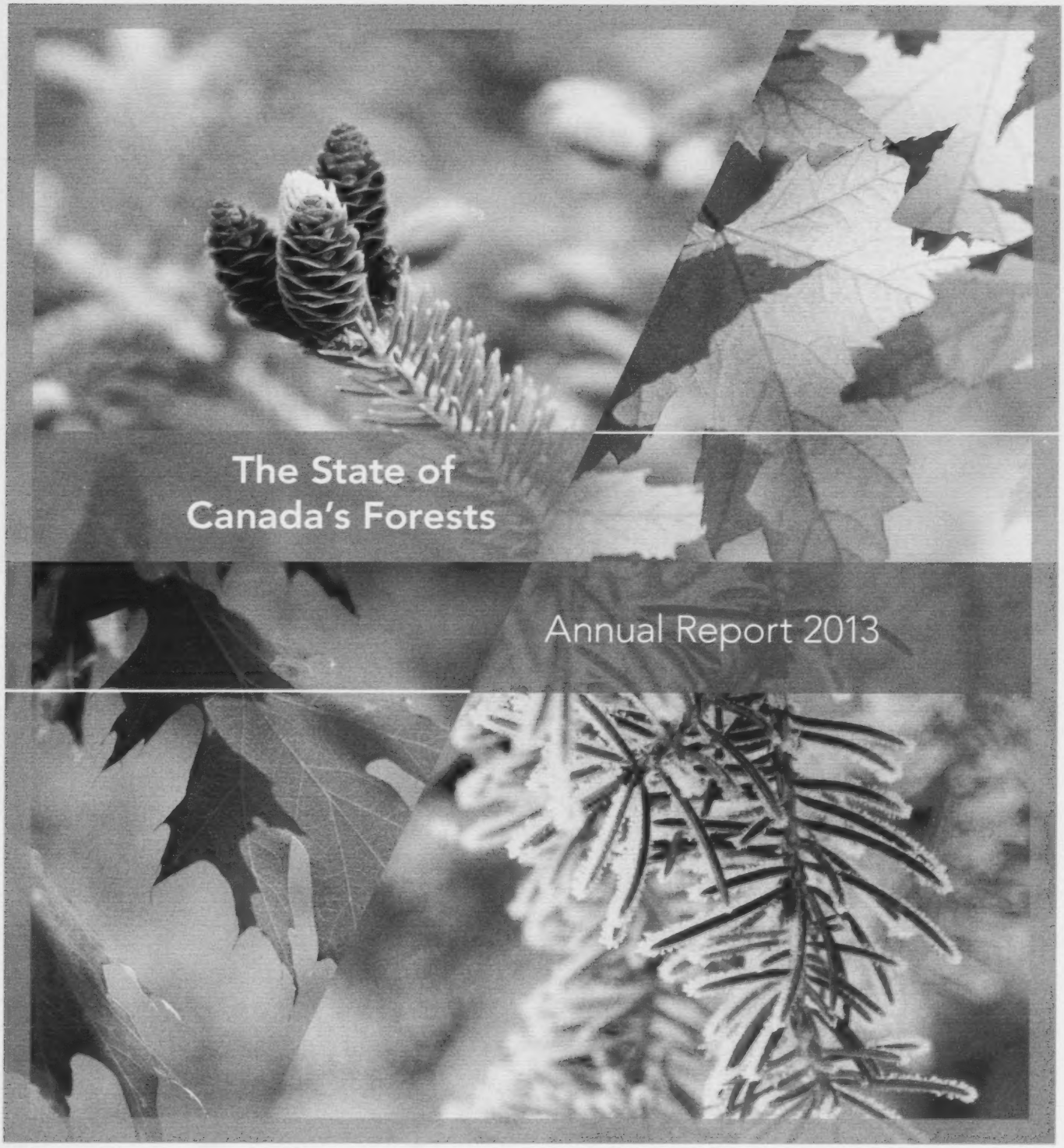

The State of Canada's Forests

Annual Report 2013

Canada

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Message from the Minister of Natural Resources

It is my pleasure to present *The State of Canada's Forests: Annual Report 2013*, which summarizes key information about the health and well-being of our nation's forests and forest sector. This annual publication contributes to Canada's reputation as a responsible supplier of forest products, and I am proud of our open and transparent model for reporting.

The outlook for our forest sector is promising following a decade of challenges. This is good news because the sector is a key contributor to Canada's economy and many communities. Buoyed by support from the Government of Canada and gains in export markets, the sector worked hard to reinvent itself in four ways:

Creating innovative products

The Investments in Forest Industry Transformation Program has been helping Canadian companies move technologies out of the laboratory and into the marketplace, bringing jobs and other benefits to communities. As the results are adopted, our industry will become even more competitive and resilient.

Expanding markets

Canada's forest companies have worked hard to expand North American markets, with help from several programs, including one aimed at proving that wood can be used for mid- and high-rise non-residential construction. Farther afield, governments and industry have been demonstrating how China and India can meet their needs through cost-effective, environmentally friendly and practical wood building solutions from Canada.

Committing to science-based sustainable forest management

Working together, the Government of Canada, research institutions and industry are developing innovative science-based solutions, mitigation strategies and management approaches to help sustain our forests. Natural Resources Canada is also supporting Responsible Resource Development in managed forests through environmental reclamation research and assessments of the ecological integrity of wildlife habitat. Our progress in continuously improving forest management practices is measured in the sustainability indicators section of this report.

Employing a highly skilled workforce

Growth in the forest sector means more secure employment for candidates with the right skills. One way the Government of Canada is helping the sector meet its recruitment needs is by promoting greater Aboriginal involvement in forest management and more partnerships between First Nations and forest-based businesses.

I hope you find this year's report informative and enlightening. We achieved many successes in 2012–2013, but the challenges are constantly evolving. I am encouraged by the agility of our forest sector in response to these shifting circumstances and am confident that the sector's strengths, combined with the continued financial support announced in Economic Action Plan 2013, will turn tomorrow's challenges into new opportunities for environmental sustainability and economic growth.

The Honourable Joe Oliver, P.C., M.P.
Minister of Natural Resources

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2012: The year in review

The Canadian forest sector's outlook appears promising following a decade of challenges. The sector has been working hard to reinvent itself and meet those challenges through the creation of innovative products, the expansion of new markets for Canadian forest products, and a continued commitment to sound environmental performance and ever-greater scientific understanding of Canada's forests. The improving trends are promising, but the forest sector has not let up in building on its recovery.

The sector's ongoing transformation has continued to pay off in recent years, with increased exports to markets such as China and South Korea and growing wood use in non-residential construction. In 2012, the U.S. housing market showed signs of recovery. Demand and prices were up, with lumber prices rising to their highest level in eight years. And innovative applications for Canadian wood products that enable the construction of taller wood buildings are finding niche markets domestically and offshore.

While challenges remain, these are indeed encouraging signs of the industry's ability to adapt and respond to shifting circumstances.

At the same time, Canada's forests are undergoing significant changes as a result of a changing climate, including more frequent fire, drought, and disease and insect attacks. This increase in disturbances, it is anticipated, could impact Canada's supply of quality fibre in the long run, posing some risks to both industry transformation and sector competitiveness. Innovative, science-based policy solutions, mitigation strategies and forest management approaches will therefore be needed to help decision-makers at every level navigate the way forward.

Strengthening Canada's forest science

A strong knowledge base about the state of Canada's forests and how those forests are changing over time is a key requirement to support forest sector transformation. Also essential is understanding the forests' non-timber values—like carbon storage, water purification and recreational use—which affect the sector's social licence and long-term sustainability.

The cumulative effects of invasive species, climate change and other pressures on forest ecosystems are causing forests and sustainable forest management to change rapidly. Natural Resources Canada–Canadian Forest Service (NRCan–CFS) leads a wide range of efforts to understand, anticipate and mitigate these changes, with the aim of maintaining the health of forests and supporting sustainable forest management into the future.

Research on insect chemical ecology at NRCan–CFS is a prime example of science contributing to sustainable forest management. By taking advantage of the chemical interactions among insect pests, their host plants and natural enemies, scientists have developed practical surveying, monitoring and control tools. For instance, the long-range attractant pheromones of the brown spruce longhorn beetle and emerald ash borer are being used in annual operational surveys by the Canadian Food Inspection Agency to determine whether these pests have spread into new areas.

Extensive work is also underway to support forest management decision-making by improving our understanding of the potential impacts of climate change as well as the adaptations needed to manage forests in a changing climate. For example:

- Since 2008, federal, provincial and territorial governments have collaborated on the Canadian Council of Forest Ministers' Climate Change Adaptation Initiative. The goal of the initiative is to define an approach in both policy and practice to adapting sustainable forest management to climate change. Through a series of reports that synthesize available knowledge, the initiative provides forest sector decision-makers with potential strategic directions, a general blueprint for assessing sustainable forest management vulnerabilities, and adaptation strategies that can be implemented at multiple scales.

- Forest Change is a complementary initiative that aims to enhance forest sector competitiveness in a changing climate by bringing together NRCan–CFS science, knowledge and tools related to climate change impacts and adaptation. A key component of the Forest Change initiative is an adaptation toolkit that includes maps, guidebooks, climate projections, decision-support systems and other tools to help forest managers, decision-makers and policy-makers anticipate changes and make informed decisions. In addition, a tracking system will report on a cohesive set of indicators on the effects of climate change to identify the areas of greatest vulnerability.

Canada's ability to manage its forests sustainably is crucial to the competitiveness of the forest sector. Increasingly, domestic and international markets demand forest products with solid environmental credentials. Consumers want forest products that come from well-managed forests and that are supported by science-based information.

Providing assurance through certification

Canada continues to demonstrate that its forest products come from well-managed forests. Certification complements Canada's comprehensive and rigorous forest management laws and regulations, and is embraced by companies as a way they can further demonstrate their sustainable forest management practices. Third-party certification provides assurance that a forest company is operating legally, sustainably and in compliance with world-recognized standards for sustainable forest management.

Of Canada's nearly 400 million hectares of forests and other wooded lands, representing 10% of the world's forest cover, just under 148 million hectares are certified as being sustainably managed by one or more globally recognized certification systems. This represents 38% of the global total of certified forests.

Expanding markets

The Canadian forest sector recognizes that, to continue its recovery, there must be market diversification with a particular focus on emerging growth markets. As part of these efforts, NRCan–CFS is continuing to work in partnership with industry and the provinces to promote the benefits and attributes of Canadian wood products abroad. These collaborative efforts are continuing to see real success, especially in Asia. For example:

- India is a growing market for Canadian wood products, newsprint and dissolving-grade pulp. In December 2010, India granted the western Canada spruce-pine-fir species grouping entry into the country. In March 2011, it granted entry to Canadian cedars (western redcedar, yellow-cedar and eastern white cedar). As a result of critical scientific analysis and research provided

in 2012 by NRCan–CFS on mutually acceptable phytosanitary standards, India issued a formal acceptance of Canadian eastern spruce species (black spruce and red spruce) in June 2013. Recognizing the potential of the Indian market for Canadian producers, NRCan–CFS, in partnership with the British Columbia government, also opened a market development office in Mumbai in 2012 to identify opportunities for Canada's forest producers; and Natural Resources Minister Joe Oliver led a mission to India to advance trade and investment.

- China remains an important expanding market for the Canadian forest sector. Canada is now the world's largest exporter of lumber to China. In 2012, Canada had a 45% share of China's softwood lumber imports and a 31% share of China's overall lumber imports. Over 7.56 million cubic metres of lumber were exported to China in 2012. Softwood lumber shipments to China have risen almost 1,000% since 2007. In March 2012, NRCan signed a Memorandum of Understanding with the Chinese Ministry of Housing and Urban-Rural Development concerning cooperation on the development of eco-cities in China. Possible areas for collaboration include wood-frame construction systems and technology, renewable and alternative energy technology, energy-efficient building systems and materials, and waste management.

- Canada is currently also South Korea's second largest supplier of softwood lumber. Between 2007 and 2012, Canadian exports of wood products to South Korea increased by 47.5% to $135 million.

- In Japan, a longstanding market for Canadian forest products, advanced Canadian wood technologies are showcased in two new public buildings: a library and a fish market. These have been rebuilt under the Canada–Tohoku Reconstruction Initiative, a partnership of the federal government, the provinces of British Columbia and Alberta, and the forest industry to support Japan's rebuilding efforts after the 2011 earthquake and tsunami. Among the benefits of these technologies are the speed of construction, versatility and seismic performance, all of which offer significant advantages in Japan's long-term reconstruction efforts.

Creating innovative products

Diversification is not just about geography. It's also about diversifying end-uses for products and creating new products and technologies. NRCan–CFS's coordinated investments in research and commercialization of innovation have made Canada a global leader in the development of important new technologies in the forest industry.

The Investments in Forest Industry Transformation (IFIT) Program is helping move new technologies out of the laboratory and into the commercial mainstream, in the process bringing jobs and other economic benefits to forest communities across the country. To date, IFIT has been the catalyst for 12 world-first or Canadian-first technology deployment projects. When successfully completed, many of these technologies are expected to be widely adopted at mills across Canada. This will help Canadian companies develop more diversified product lines, which in turn will help make the companies both more competitive and more resilient in the face of fluctuations in demand or price for any one product or commodity. For example:

- In Drayton Valley, Alberta, Tekle Technical Services is creating Canada's first engineered fibre mat plant. In a unique process developed in Canada, aspen, spruce, pine and fir residues are combined with agricultural fibre residue to make a variety of products for the expanding natural fibre market—from interior trim parts and panels for cars to natural fibre building insulation and biodegradable erosion control mats. The technology replaces fibreglass and petrochemical-derived plastics with rapidly renewable natural materials that would otherwise be dumped in landfills or burned. This offsets the emission of air pollutants and greenhouse gases such as carbon dioxide, methane and nitrous oxide.

- In a North American first, Tolko Meadow Lake OSB, in Meadow Lake, Saskatchewan, is implementing innovative technologies for screening wood strands for oriented strand board (OSB) and producing both commodity and specialty products on a single production line. The facility will also make use of wood dust and unusable fines screened from the process as a fuel source, thereby improving air quality and reducing fire risk in the mill. Tolko Meadow Lake will benefit from the flexibility and efficiency provided by the new technologies and from the ability to diversify and respond to unique market needs, while local First Nations will benefit from the continued operation of the facility.

- In a global first, LAUZON, Planchers de bois franc exclusifs inc., in Papineauville, Quebec—in collaboration with the Centre de recherche industrielle du Québec and FPInnovations—is piloting a Canadian-developed optical scanning technology. This technology will enable the company to convert low-quality forest resources into high-quality customized hardwood flooring, while increasing the amount of fibre recovered from the logs (to 70% from the industry standard of 40%). By maximizing the amount of wood fibre that can be used in the flooring, LAUZON is significantly increasing the value of each log that is used.

In addition, countries such as China and India, which are at the forefront of the global movement toward urbanization, are increasingly looking to wood as the construction material of choice because of its low-carbon footprint, energy efficiency and ability to withstand earthquakes. Canada is positioning itself to meet the demands of the global marketplace by demonstrating that wood can be used to build mid- and high-rise structures, and showing how Canada's forest industry can offer cost-effective, environmentally friendly and practical solutions in this type of construction.

In 2012, NRCan–CFS, in collaboration with FPInnovations, initiated support for research to advance "tall wood" building design. It will invest an additional $5 million in the years ahead. Along with the Canadian Wood Council, NRCan–CFS is also working with regulatory agencies to implement changes by 2015 in the National Building Code of Canada, which currently restricts mid-rise wood frame construction. The goal is to enable Canadian architects, engineers and builders to design and build wood structures of up to six storeys in various occupancy categories (e.g., residential, commercial, light industrial). Meanwhile, interest in the concept of tall wood buildings is growing not just in Europe, the U.S. and Australia but also in Asia.

Cross-laminated timber

A potential component of tall wood buildings is cross-laminated timber (CLT), a multi-layer wooden panel in which each layer is stacked perpendicularly to the previous one and then all layers are glued together using hydraulic or vacuum presses. A highly versatile product, CLT is much lighter than concrete but strong enough to support multi-storey structures. It is also much easier and more economical to transport and install, and is more energy-efficient than conventional materials.

The use of CLT in North America is gaining interest in both the construction and wood industries. FPInnovations' multidisciplinary research program on CLT, initiated in 2007 under NRCan's Transformative Technologies Program, produced the *CLT Handbook* in 2012, with a U.S. version published early in 2013. The handbook provides key technical information on the manufacturing of CLT and its use in design and construction. The American National Standards Institute (ANSI) approved standards for CLT in October 2012, which will foster the use of CLT in North American mid-rise and non-residential construction.

Working together

The research and development work underway in every area of Canada's forest sector is beginning to yield promising results. These achievements can be attributed largely to the greater-than-ever collaboration of research agencies across the country, including those in government, industry and universities. These relationships, as well as those with the provinces and territories, communities, Aboriginal groups and international partners, are essential in ensuring the continuing transformation of Canada's forest industry.

For example, in May 2013, NRCan–CFS signed a collaborative research agreement with Memorial University, in partnership with the Newfoundland and Labrador Department of Natural Resources, to develop an innovative model for forest research integration. This new partnership will develop a common research agenda and share human and institutional capacities to enhance collaboration and strengthen research capacity in Canada's eastern boreal ecosystem.

At the North American level, 2012 saw increasing collaboration between Canada and the U.S. on a number of fronts. For example, the two-year extension of the 2006 Canada–U.S. Softwood Lumber Agreement signed in January 2012 secures stable and predictable access to the U.S. market for Canadian softwood lumber products until October 2015. Canada and the U.S. are also collaborating on diversifying market segments. Canada has been providing the U.S. WoodWorks initiative with support since 2007, and in 2012 provided US$1.5 million. Based largely on the Canadian WoodWorks program, the US$4.5 million initiative is supporting a team of technical advisors (including architects and engineers) in their efforts to promote wood use in non-residential and mid-rise construction. U.S. WoodWorks includes technical training activities for architects, engineers, code officials and students; direct technical assistance for industry practitioners to assist them in incorporating wood in their projects; and the development of technical publications and tools that help these practitioners design with wood. In 2012, the U.S. and Canadian WoodWorks initiatives supported the use of more wood in the structural and interior design of 109 projects in North America, representing $85 million in new wood product sales.

Canada and the U.S. are also leveraging their knowledge and strengths to address a variety of issues of common concern, such as forest health. The two countries not only share the longest border between any two nations in the world, with 400,000 people crossing daily, but they are the world's largest trading partners as well (with $1.7 billion in trade per day). Forest disturbances on both sides of the border will continue to be of concern for the forest sectors and the populations of both countries.

Two forest health summits were held in the past year, in Washington, D.C. and Ottawa. These brought together funders and users of forest science and technology in Canada and the U.S. with forest researchers and technology developers. They agreed that efforts should focus on forest pests, wildland fires, forest inventory and analysis, enhanced use of wood in construction, and genomics applied to forest sector needs. Experts from both countries are now developing a bi-national forest health science agenda, aimed at maximizing the value of the critical work that scientists and researchers are doing on both sides of the border to ensure the health of the two countries' forests and forest sector.

As a global leader in sustainable forest management, Canada continues to share its experience with others internationally:

- Under the Canada–Mexico Partnership, both Canada and Mexico continue to benefit from a common understanding and approach to combatting forest fires through a well-established firefighter training program. Building on this collaboration, work is underway to establish an arrangement that will improve response time to emergency requests and assist in the sharing of wildfire management resources.

- The International Model Forest Network (IMFN), initiated by the Government of Canada, marked its 20th anniversary in 2012. With over 60 sites in more than 30 countries, as well as thousands of participating organizations, the IMFN has helped to increase international recognition of the value of landscape- or ecosystem-based approaches to resource management.

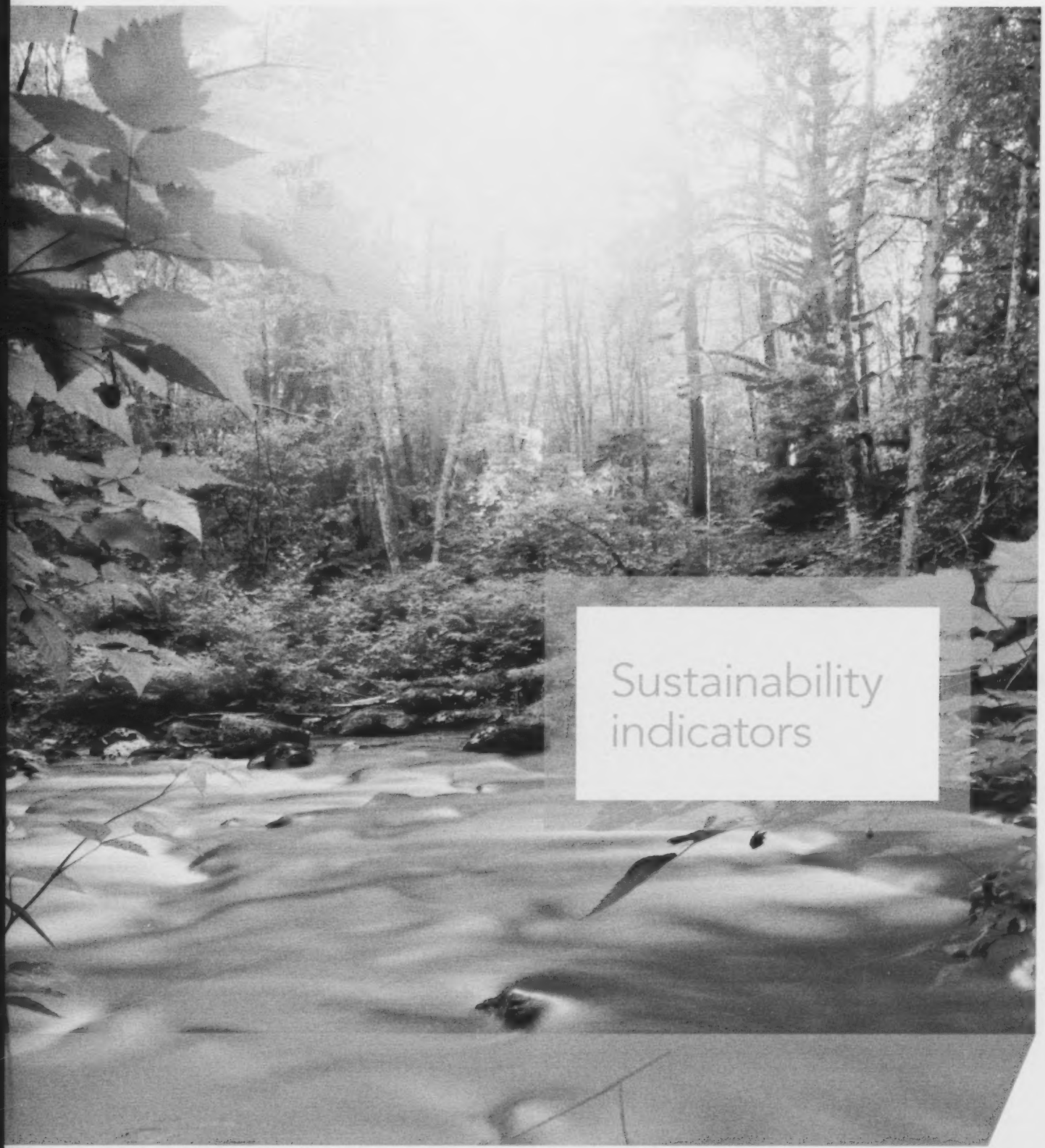
- In 2012, the Canadian Forest Service continued as the lead technical agency for Canada on the World Bank's Forest Carbon Partnership Facility (FCPF) and Carbon Fund. The FCPF is the world's leading effort to work with eligible developing countries to put in place the preconditions for performance-based incentives for Reducing Emissions from Deforestation and Forest Degradation. The Carbon Fund will ultimately pilot the performance-based schemes themselves.

- In 2012, NRCan–CFS led collaborative efforts to reduce the burden of global forest reporting. As Chair of the Montréal Process, NRCan–CFS brought together key international sustainable forest reporting initiatives to find ways to streamline global reporting. The Collaborative Forest Resources Questionnaire, released in late 2012, will increase the consistency of information about the world's forests. Beginning in 2013, the questionnaire will be used by over 100 countries to collect data once for use in meeting multiple forest reporting obligations.

Looking ahead

Canada's forest sector will continue to see its transformation efforts pay off. To ensure its ongoing success, governments, industry, academia and forest-based communities will need to build on the work they have started—from seeking opportunities in new markets, both offshore and in non-residential construction, to bringing out of the lab and into production game-changing technologies, products and processes that look beyond the ways in which wood has traditionally been used. Capital investment, innovative thinking, collaboration, a highly skilled workforce living in forest communities: all of this will provide the support essential to seeing the transformation through.

Forest science will also continue to play an important role, informing decision-makers and stakeholders about fire, invasive species and climate change, and supporting the development of long-term mitigation, prevention and adaptation strategies to ensure continued sustainable forest management. Working collaboratively both internally and with its partners, NRCan–CFS will also continue striving to develop insightful solutions to these multi-faceted challenges, to position Canada as a global leader in sustainable forest management, and to ensure that our nation's forests remain healthy for future generations.



Sustainability indicators

Canada's forests are renewable resources and rich, resilient ecosystems. They offer environmental benefits, opportunities for responsible economic development, and innumerable tangible and intangible values important in maintaining the quality of life of all Canadians.

What are sustainability indicators?

Sustainability indicators are science-based measures that give government, industry, researchers and the public a consistent way to define, assess, monitor and report progress on sustainable forest management. The indicators:

- complement Canada's rigorous framework of sustainable forest management laws and regulations
- help identify where forest management practices and policies can be improved
- clearly communicate Canada's environmental credentials
- inform dialogue about the state of Canada's forests

At the national level, Canada uses a comprehensive set of 46 indicators that represents the full range of forest values Canadians want conserved or sustained. These indicators, developed through broad public input, characterize the essential components of sustainable forest management. They recognize forests as ecosystems that provide a wide, complex and dynamic array of environmental and socio-economic benefits and services.

What do the sustainability indicators tell us?

The answer in short: thanks to Canada's ongoing commitment to sustainable forest management, the country's forests contribute significantly to Canadians' lives and the nation's well-being. This is not to say that the need to respond to the challenges—economic and environmental in particular—is over. On the contrary: efforts can be strengthened in several areas, including further product innovation and market expansion and better understanding of forest disturbances and their potential impacts. Challenges will always arise, but sustainable forest management gives Canada's forest sector the ability to respond to these quickly and effectively.

Ensuring healthy, productive forests and a cleaner environment

As Canadian forest industries continue to transform by investing in new technologies and new markets, they count on having a healthy, productive and sustainable forest resource base. The indicators show positive results in this area:

- Canada has nearly 400 million hectares of forest, other wooded land and other land with tree cover—in all, 10% of the world's forest cover.
- About 640,000 hectares of forest were harvested last year—just under 0.2% of Canada's total forest land.
- Across the country, timber is being harvested at rates more than 30% below the wood supply considered to mark the sustainable limit; natural and artificial regeneration are ensuring that sites harvested remain productive; and the annual rate of deforestation has declined to about 45,000 hectares a year—0.01% of the total forest area annually.
- The forest sector's overall greenhouse gas emissions have dropped by 48% since the 1990s. It achieved these reductions by decreasing its reliance on fossil fuels, increasing energy efficiency and reducing energy use.

Providing wealth for Canadians

The Canadian forest sector has faced enormous challenges over the last decade and segments of the industry (such as pulp and paper) continue to recalibrate to succeed in these new conditions. Notable gains have been made in many areas, spurred in part by the recent U.S. housing recovery. In 2012:

- The forest sector's contribution to Canada's GDP rose slightly to $18.7 billion (1.1% of the GDP) from $18.1 billion in 2011.
- Forest product exports reached $25.1 billion, with softwood lumber exports surpassing $5.7 billion—an increase of 10.8% over 2011.
- China accounted for 16.3% of all Canadian forest product exports (compared with 1.8% in 2002).
- Direct employment in the forest industry continued its modest recovery, increasing by 0.9% and reaching almost 236,000.

Improving the social well-being of Canadian families

The Canadian forest sector continues to be a major employer nationwide, particularly in rural communities where forest-related work is often the main source of income.

- For about 200 communities across Canada, the forest sector makes up at least 50% of the economic base.
- Communities across the country benefit from numerous forest-associated values and services, such as recreation and ecotourism.

Building confidence in Canada's environmental leadership

Canada's forests are a source of national pride and an important contributor to the economy.

The 20+ years of committed effort to sustainably manage the country's forests are paying off and Canadians can look forward with confidence to their forests continuing to provide a broad range of benefits even within a constantly changing economic, environmental and social context. Also important is knowing that Canada's trading partners can feel confident that Canadian forest products delivered to them come with strong environmental credentials from sustainably managed sources.

The following sections report on 12 of the 46 indicators, grouped according to forest values. These 12 indicators were chosen based on their relevance and practicality and on data availability and currency. To see the complete list of indicators, visit cfs.nrcan.gc.ca.

Biological diversity

Biological diversity (commonly shortened to "biodiversity") refers to the variety of species and ecosystems on Earth and the ecological processes they are part of.

This complex, closely interconnected web of diversity is what enables organisms and ecosystems to respond and adapt to environmental change. Conserving biodiversity is therefore crucial to maintaining the long-term health of Canada's forests and ensuring they remain sustainably productive.

Status of forest-associated species at risk

Why is this indicator important?

An important objective of sustainable forest management is the maintenance of healthy populations of forest-associated species of flora and fauna. Forest-associated species are those that require forest habitat to complete their lifecycle.

Forest-associated species said to be at risk are particularly vulnerable to changes in forest habitat. Change over time in the number and conservation status of these forest-associated species is one indicator used to assess the sustainability of forest management practices and the effectiveness of management intervention.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) meets annually to assess the conservation status of species thought to be at some degree of risk. COSEWIC uses the best available scientific, community and Aboriginal knowledge to evaluate risk of extinction.

What has changed and why?

Currently, 369 COSEWIC-listed forest-associated species are at risk in Canada.

In November 2012 and May 2013, COSEWIC reassessed or newly assessed 64 species at risk. Thirty-two are forest-associated species. Of these:

- Fifteen were added to the list for the first time since the previous assessment, including two forest birds:
  - wood thrush (threatened): this was formerly one of the most common forest birds in eastern North America, but the Canadian population has decreased by almost 70% in the last 40 years; and
  - eastern wood-pewee (special concern): this is a member of the aerial insectivores (birds whose diet is mainly flying insects), a group that is declining in number faster than any other group of birds
- Seventeen species were reassessed. Of those, 14 had no change in their risk level, none were moved to a higher-risk category, and three were moved to a lower-risk category.

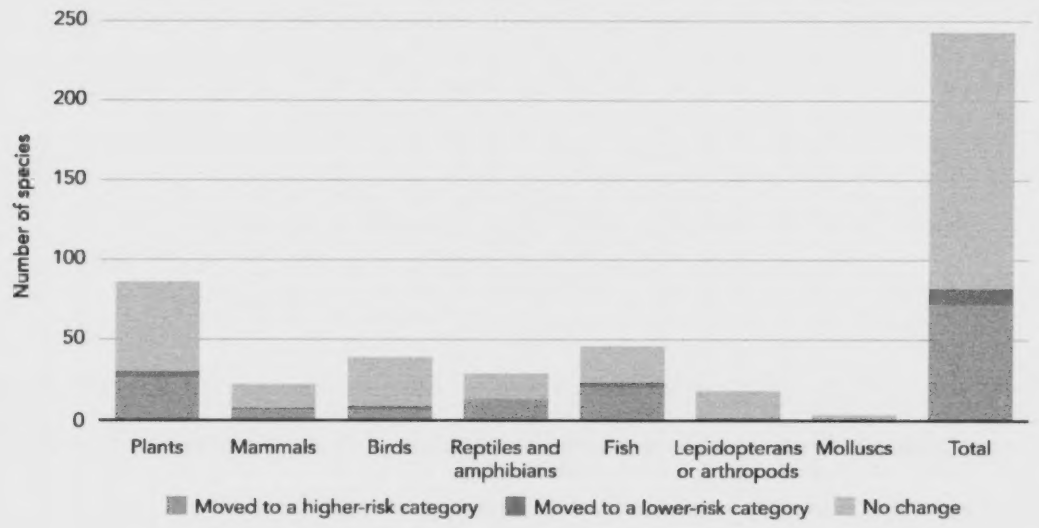
What is the future outlook?

The total number of endangered, threatened and special concern wildlife species assessed by COSEWIC will continue to increase into the short term because COSEWIC is far from finished assessing suspected at-risk wildlife species. Important to note is that the increase in total number of wildlife species assessed mostly reflects the growing capacity of COSEWIC to fully investigate and assess wildlife species suspected of being at risk.

Actual increases in the number of forest-associated species at risk, however, would signal the cumulative effects of numerous multifaceted factors at work.

Ecosystem-based approaches to forest management (such as the emulation of natural disturbances) are key to practical and successful species conservation strategies throughout Canada's commercial forests. Natural Resources Canada–Canadian Forest Service (NRCan–CFS) has been working diligently to define and track indicators of forest ecosystem integrity (such as species composition). Research is also being conducted to better delineate the impacts of forest management on forest ecosystems in contrast to other drivers (e.g., climate change, invasive species, pollution). NRCan–CFS is also leading activities to support the identification of best management practices for species known to be particularly sensitive to forest harvesting activities, such as the American marten and woodland caribou.

Change in COSEWIC status of forest-associated species at risk, 1999–2013



Note: 126 species that have been assessed only once so far (and therefore have exhibited no known change in status) or for which data are insufficient to estimate status are not included in the graph.

Source: Committee on the Status of Endangered Wildlife in Canada

Ecosystem condition and productivity

Canada's forest ecosystems must be resilient so they can cope with, and recover from, natural disturbances such as wildfire and insect infestations, and human disturbances such as timber harvesting.

Understanding where these disturbances occur, how extensive they are and what impact they have on ecological functions and processes is necessary if a sustainable flow of benefits from the forest landbase is to be maintained.

Additions and deletions of forest area

Why is this indicator important?

Knowing how and why forest areas change over time is important for managing forests sustainably because such changes may result in long-term deletions (deforestation) from or additions (afforestation) to Canada's forest landbase.

- *Deforestation* means the long-term conversion of forest to other land uses. In Canada, deforestation is mainly the result of forest land being converted to use for agriculture, industrial development, resource extraction and urban expansion. Harvesting, when followed by regeneration, is not deforestation.

- *Afforestation* means the establishment of new forests on previously non-forested land.

Deforestation is a concern because forests provide a number of ecological services, such as water purification, erosion control and provision of wildlife habitat. Forests also contribute to global climate stability by acting as sinks and sources of carbon dioxide. Monitoring forest additions and deletions helps scientists gauge Canada's ability to meet its climate change-related commitments.

What has changed and why?

Over the last two decades in Canada, the annual rate of deforestation has declined, dropping from just over 64,000 hectares in 1990 to about 45,000 hectares in 2010. Spikes in this downward trend have occurred for short periods, however, when forested areas have been submerged by water reservoirs associated with large hydroelectric projects. For example, 35,000 hectares of forest area were lost in the mid-1990s and another 28,000 hectares were lost in the mid-2000s because of the development of reservoirs. Since 1990, about 0.33% of Canada's total forest area has been converted to other land uses.

In 2010, deforestation resulted in net emissions of 15.7 million tonnes of carbon dioxide equivalent, down from 27.5 million tonnes in 1990.[1]

Limited afforestation has been carried out in Canada since 1990 relative to the total area of forested land. Although millions of trees are planted each year to supplement natural regeneration, these efforts are occurring primarily as part of sustainable forest management in areas that were already forested.

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1 These numbers account for lateral transfers of carbon from the forest ecosystem to the forest product sector, in the form of (1) greenhouse gas emissions to the atmosphere and (2) residual emissions from deforestation in previous years.

Urban and rural planting initiatives are underway in many regions, including Quebec, Ontario and the Prairie provinces.

What is the future outlook?

The trend of decreasing deforestation is expected to continue over the next four decades or so, but at a slower pace. Conversion of forest to agricultural land uses will remain the largest factor. Although the rate of deforestation for agriculture is expected to decrease, it is possible that economic or policy changes within the agricultural sector could increase deforestation rates. Only the oil and gas sector is currently experiencing an increase in deforestation rates. Over the next decade these rates are expected to stabilize or increase, although that will depend on how economic conditions affect oil and gas activity. Predicting future deforestation with precision is impossible, but it is anticipated that the overall rate of deforestation in Canada will be lower in the future than it is today.

Estimated area (hectares) of deforestation in Canada, by industrial sector, 1990–2010

	Year[a]				
Sector	1990	1995	2000	2005	2010
Agriculture	42,100	22,200	20,500	19,100	18,900
Forestry[b]	3,700	3,300	3,600	3,800	3,800
Hydroelectric infrastructure[c]	2,700	1,500	900	1,100	600
Industry and transportation[d]					
Industry	900	900	900	900	900
Mining	2,800	2,700	2,900	2,700	2,500
Oil and gas	4,400	5,400	7,900	11,300	11,100
Transportation	2,000	1,700	3,000	2,800	2,700
Municipal[e]	3,900	3,700	4,300	4,700	4,700
Peat mining	900	700	500	100	100
Recreation[f]	600	700	700	600	600
Total[g]	**64,000**	**42,600**	**45,000**	**47,200**	**45,900**

a Values reported are for listed year.

b Resulting from the creation of permanent forest access roads.

c Excludes reservoirs.

d Includes mines, gravel pits, oil and gas projects and highway construction.

e Includes urban development.

f Includes ski hills and golf courses.

g Totals adjusted for rounding.

Sources: Canadian Forest Service, Deforestation Monitoring Group; and Environment Canada, *National Inventory Report 2013*

Area of forest disturbed by fire, insects, disease and harvesting

Why is this indicator important?

Canada's forest ecosystems are frequently exposed to natural disturbances such as fire, insect infestations, disease outbreaks and weather-related events that affect forest health and structure. In some cases, these disturbances threaten what we value in our forests (e.g., timber, wildlife habitat, recreational opportunities), but they also help promote the natural functioning of the ecosystem, maintain biodiversity and shape forest structure. Some natural disturbances also play a key role in forest renewal.

As well, a small portion of Canada's forests is disturbed by harvesting and other human activities each year. Forest managers look increasingly to natural events for insights into planning forest harvesting, working to ensure that their practices facilitate natural regeneration and recovery of ecosystem productivity following harvest.

Scientists study both natural and human disturbances to gain a better understanding of how forest ecosystems change and what level of disturbance is acceptable. While disturbance is a healthy part of the forest ecosystem, it can also weaken or kill large numbers of trees, affecting productivity in commercial regions, with important social and economic consequences.

What has changed and why?

Fires

In 2012, 7,288 forest fires were reported across Canada, consistent with the previous 10-year average (2002–2011). The area burned in 2012 (1.9 million hectares) was about 5% lower than the 10-year average.

Although the severity of the 2012 fire season was typical for Canada as a whole, several fires exhibited extreme behaviour. The most active region was around the border between Northwest Territories, British Columbia and Alberta in July.

- Nova Scotia and Alberta experienced a spike in fire activity early in the season, which caused several evacuations and structural losses.
- Ontario had an above-average number of fires during the 2012 season, including several spring fires near Timmins and Kirkland Lake that caused evacuations, property damage and gold mine shutdowns.
- Newfoundland and Labrador saw an above-average area burned as a result of extreme fire weather in June, which resulted in several evacuations in central Labrador.
- British Columbia experienced a quiet start to the fire season, with fire activity increasing through July. However, both the area burned and the number of fires were below average.
- Northern Alberta experienced a greater-than-average area burned, which included large fires in Wood Buffalo National Park.
- Saskatchewan and Quebec experienced a below-average fire season.

Insects

In 2011, about 9.2 million hectares of forest contained trees killed by the mountain pine beetle or defoliated by other insects—a decrease from 12.8 million hectares the year before.

From 1998 to 2012, the mountain pine beetle killed about 18.3 million hectares of pine forests in British Columbia, resulting in the loss of more than 720 million cubic metres of timber—roughly 55% of the province's commercial pine inventory. As mountain pine beetle populations wane in British Columbia, their persistence and continuing spread north and east are creating new risks to pine forests outside the insect's historical range. Recent range expansion has occurred northward through the Rocky Mountain Trench to northern British Columbia and the Northwest Territories and eastward to Alberta. Since the beetle invaded northern Alberta in large numbers in the migration flight of 2006, more than 1.3 million hectares of forest have been affected in that province.

The area impacted by mountain pine beetle in British Columbia has declined steadily since the outbreak peaked in 2007, declining from 6.2 million hectares in 2010 to 4.6 million hectares in 2011 and then to 3.0 million hectares in 2012.

In Alberta, the gross area affected by mountain pine beetle has increased steadily since 2002. However, large parts of the perimeter area affected exhibit "trace" (<1%) levels of infestation—and, in one location, for the first time in recorded history, the beetle has been detected mass-attacking trees north of latitude 60°.

Outbreaks of some insects are cyclical, with peak populations occurring periodically in particular regions of the country. For example, outbreaks of eastern spruce budworm recur at approximately 30- to 40-year intervals in eastern Canada. The last extensive outbreak covered more than 50 million hectares in the 1970s and then declined to fewer than 1 million hectares in the late 1990s. Since the mid-2000s, however, a new outbreak has been developing in eastern Canada. Similarly, the western spruce budworm periodically reaches outbreak levels in British Columbia. Since 2003, this insect has defoliated more than 500,000 hectares of Douglas-fir forest annually, mostly in the southern interior of the province.

Alien species are a particular concern for forest managers because of the uncertainty of how these new species might affect native ecosystems. The emerald ash borer, for example, has killed millions of ash trees in parts of Ontario and Quebec over the last decade; and it continues to spread into new areas, with significant economic and ecological impacts.

Diseases

As agents of disturbance in forest ecosystems, forest diseases (or pathogens) are major drivers of diversity, shaping forest structure and function. Pathogens also play a major role in decomposition and carbon cycling in Canada's forests. Nevertheless, forest pathogens can cause significant problems when the disease increases beyond an acceptable threshold.

Across Canada, Armillaria root disease is one of the most destructive and widespread diseases involving pathogens that attack the roots and base of trees. It currently affects 203 million hectares of forest to varying degrees, with long-term persistence. Surveys of Douglas-fir in British Columbia and spruce and balsam fir in Ontario have shown that Armillaria infection increases steadily in those species with stand age, whether after planting in harvested stands or after disturbance in natural stands. Another common root disease, Annosus root and butt rot, is now affecting an increased number of forest stands and has established in regions not previously exposed to the disease.

Although root diseases are one of the most widespread pathology problems in Canada's forests, the symptoms they cause are difficult to detect. Nationally, Armillaria root disease affects all tree species, and can be a killer both in young, previously harvested stands and in older stands. Stands aged 30–80 years rarely have high mortality, but infected trees suffer permanent growth reduction of up to 50%. On the Canadian forest landscape, the area affected by Armillaria root

disease does not change from year to year, but root infection intensifies over time. In contrast, the area affected by Annosus could change.

Several alien invasive forest pathogens are also prominent in Canadian forests, in some cases threatening the survival of certain tree species. For example, white pine blister rust has destroyed extensive stands of white pine since being introduced into Canada in the early 1900s. Another introduced pathogen, the European race of the fungus that is causing Scleroderris canker in the forests of Ontario, Quebec and New Brunswick, has now become a considerable problem in Newfoundland. There it has breached a quarantine zone on the Avalon Peninsula and is threatening the native red pine stands on the island.

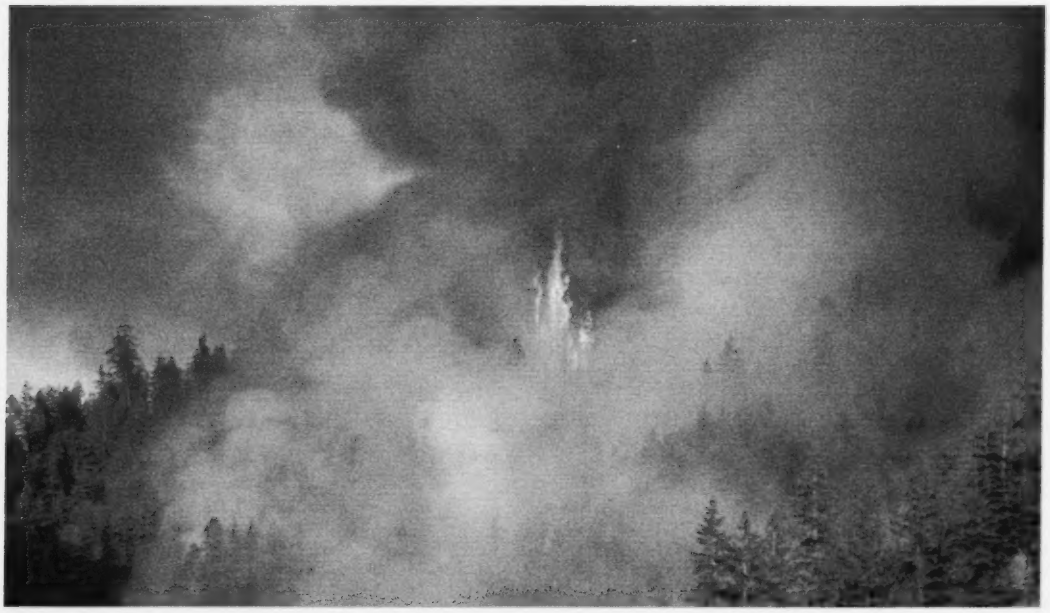
Since 2009, milder and more humid spring weather has favoured the development of many foliar diseases in Quebec, such as brown-spot needle blight and needle cast of white pine, shoot and needle blight of balsam fir, and anthracnose of maple and oak. Similar phenomena have been observed in Ontario, where ink spot of aspen affected more than 1,800 hectares of forest in northern Ontario in 2009, and in southern New Brunswick, where stands show red pine affected by Sirococcus shoot blight. Although these foliar diseases do not typically threaten the survival of affected trees, they can reduce plant growth.

Harvesting

In 2011, about 640,000 hectares of provincial, territorial, federal and private forest land were harvested. This represents a slight decline from the previous year and is significantly less than the 1 million hectares per year that were harvested during the peak period of 1995–2005.

Beginning in 2005, the area harvested began a downward trend that coincided with the decline in demand for forest products associated with the global economic downturn. The area of forest land harvested each year fell to its lowest level in 2009. While it has since increased as timber demand has risen in response to the economic recovery, the area harvested in 2011 is still well below the average annual area harvested during the peak period.

Since 1990, the area disturbed by harvest each year has been equivalent to less than one-half of 1% of Canada's 347.6 million hectares of total forest land. In 2011, the area harvested was slightly less than 0.2% of Canada's total forest land, which is a significantly smaller portion than is disturbed each year by natural causes.



What is the future outlook?

The mountain pine beetle outbreak in British Columbia will likely continue to decline overall. Within the expanded range in Alberta and the Northwest Territories, future northward and eastward expansion of the beetle will depend on a range of factors: its ability to survive the winter; its development during the summer; its interactions with native and new host trees; the distribution of susceptible host trees; and the effectiveness of control efforts within Alberta. Important to note, however, is the substantial variability in both British Columbia and Alberta between districts in terms of trend histories and expectations. In core districts attacked in 2007 and earlier, the local trend is toward declining levels of impact. Around the expanding leading edge, the local trend is toward increasing levels of impact.

Future climate and other forest-level changes are expected to affect forest pathogens. For example, Dothistroma needle blight is becoming more common in northern British Columbia pine species, probably because of altered climate. There is concern that this blight could spread into eastern Canada where suitable habitat is also found. To spread eastward it must infect Jack pine (a host), but that species' degree of susceptibility to the fungus is unknown.

Area harvested fluctuates over time, but even at peak levels the overall harvest-related disturbance is insignificant when compared with area disturbed by fire, insects and disease. Generally speaking, the area harvested is strongly correlated with the demand for timber, which in turn is driven by the demand for manufactured forest products. Given that the economic recovery is expected to continue, the area harvested is also expected to increase in the short term, though likely remaining below the peak levels of the late 1990s.

Area of forest disturbed in Canada, by cause, in 2011 or 2012[a]

Cause of disturbance	Hectares (millions)	Percentage change from previous year
Area burned (2012)	1.9	-21.1
Area disturbed by major insects		
Forest tent caterpillar (2011)[b]	0.6	172.1
Mountain pine beetle (2012)[c]	3.0	-4.2
Spruce budworm (2011)[b]	1.7	6.0
Area affected by pathogens		
Armillaria root disease[d]	203.0	0.0
Area harvested (2011)	0.7	-6.2

a Year for which the most recent data are available.

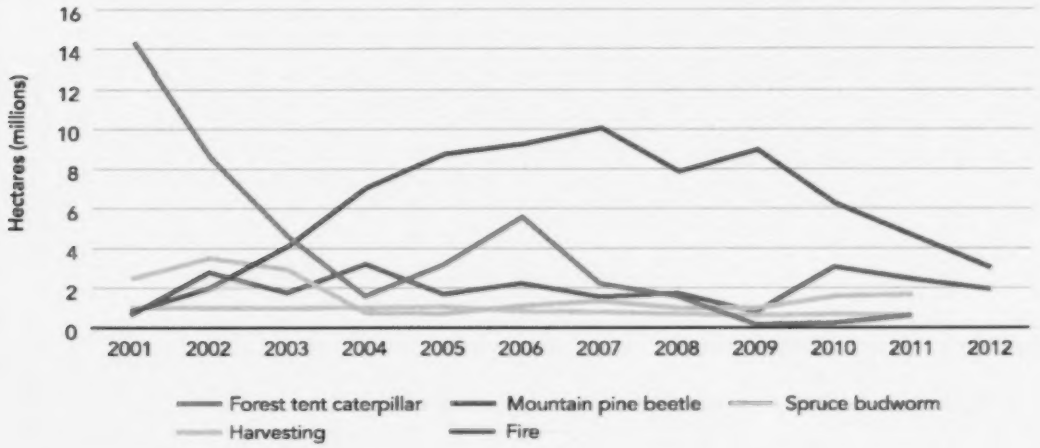
b Area includes moderate to severe defoliation.

c Area containing beetle-killed trees in British Columbia only. The province of Alberta does not report the sum area affected. Survey methods and survey efforts vary considerably across Alberta, and accurate counts and precise estimates of impact are not currently available for the entire province.

d Area affected remains constant year to year, but disease intensity changes.

Sources: Canadian Interagency Forest Fire Centre; National Forestry Database; and British Columbia Ministry of Forests, Lands and Natural Resource Operations

Area of forest disturbed annually by fire, insects (three species) and harvesting, 2001–2012



Note: Area disturbed by mountain pine beetle includes only British Columbia.

Sources: Canadian Interagency Forest Fire Centre; National Forestry Database; and British Columbia Ministry of Forests, Lands and Natural Resource Operations

Proportion of timber harvest area regenerated by artificial and natural means

Why is this indicator important?

Successful regeneration of harvest areas ensures that forest lands remain productive for wood fibre and continue to provide key ecosystem services such as storing carbon, regulating water quality and quantity, and providing recreation opportunities and wildlife habitat.

In Canada, provincial laws dictate that all harvested areas on provincial Crown lands must be successfully regenerated. Provinces set standards or have regulations to determine whether a harvest area has been successfully regenerated. These standards vary by province, but commonly incorporate such criteria as species composition; density and distribution; age and height of the regenerating trees; and distribution of various forest types and age classes across the landscape. Harvested areas must meet provincial regeneration standards in a specified period of time.

Artificial regeneration (i.e., planting and seeding) increases the likelihood of achieving regeneration to planned future forest species compositions. It also provides the maximum control of density and stocking.

Natural regeneration can be effective when prescribed for certain conditions and for certain species, such as aspen or lowland spruce. The main benefit of natural regeneration is that it requires minimal human assistance and is therefore potentially less costly than artificial regeneration. However, natural regeneration offers less control over species composition, and remedial measures such as thinning or fill planting may be needed to regulate density and stocking to meet regeneration standards.

The proportion of harvest area regenerated naturally and artificially can fluctuate as a result of several factors, including harvest level of different forest types (e.g., upland or lowland, conifer or hardwood), the silvicultural systems prescribed (e.g., clearcut, shelterwood, selection), and provincial policies on renewal standards. The ratio of artificial to natural regeneration varies across the country, but nationally has been relatively even over the past 20 years.

Total area regenerated is correlated with the area harvested. However, reported regeneration rates can be assumed to apply to the area harvested two years before, since regeneration activities are typically completed about two years following the year of harvest.[2]

What has changed and why?

With the onset of a decline in the U.S. housing market and in the associated demand for Canadian solid wood products, harvest area[3] sharply declined between 2005 and 2009. Corresponding to the decline in harvest was a similar reduction in annual area artificially regenerated, beginning in 2008. However, the downward trend in the area planted and seeded, as well as in the number of seedlings planted, showed signs of reversing in 2011. Only a slight decline was noted (-0.4%) for planted and seeded area, along with a 7.1% increase in the number of seedlings planted—a change driven largely by increases in British Columbia. Nevertheless, both of these statistics are still more than 12% lower than their respective 10-year averages.

In 2011, the proportion of area regenerated artificially climbed to 67% of the total harvest area—notably higher than the traditionally 50/50 proportions of artificial and natural regeneration observed nationally. The rise in proportion of area planted and seeded that started in 2006 is attributable mostly to increased planting activity in Quebec that began that year. This increase in planting has occurred despite a sharp decline in harvest rates that began at the same time. The harvest in Quebec accounts for nearly a third of the total area harvested across the country, so changes in renewal strategies can influence the national statistics.

What is the future outlook?

With export markets improving for many Canadian wood products, harvest levels should continue to rebound from the 20-year low set in 2009. Subsequently, the area planted and seeded should also rise in coming years, since reforestation levels are inherently linked to the amount of forest harvested. Whether the proportion of area harvested that is artificially regenerated will stay at current levels or recede to historical levels is not yet clear. If the proportion does stay high, it will signal a shift in policy for those jurisdictions that make the higher investments in renewal (e.g., Quebec).

2 There is typically a two-year lag between harvest and artificial regeneration to allow for site preparation and provision of nursery stock. Therefore, for this analysis, the area planted and seeded in 2011 is compared with the area harvested in 2009, and the area naturally regenerated in 2011 is assumed to be the difference.

3 Data are for forests on Crown lands across Canada. Federally and privately owned lands are excluded.

Area harvested and regenerated in Canada, by artificial and by natural means, between 2009 and 2011

	Area (hectares)	Percentage of 2009 harvested area[a]	Percentage change in area from previous year	Percentage change in area from 10-year average[a]
Harvest 2009[b]	537,000		-9.8	-35.1
Regeneration method				
Natural[c]	177,000	32.8	-24.4	-54.6
Artificial	360,000	67.2	-0.4	-18.0
Planting	349,000	65.1	-0.1	-16.1
Seeding	11,000	2.1	-7.2	-51.4

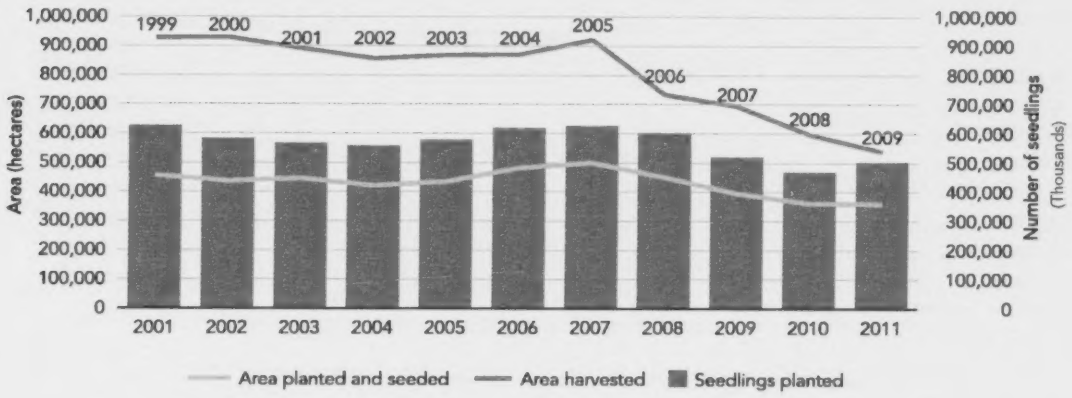
a The 10-year average for harvest is for 1999–2008. The 10-year average for natural and artificial regeneration area is for 2001–2010.

b Assumes a two-year lag between harvest and regeneration. Harvest area data are from 2009. The portion of 2009 harvested area that is regenerated is calculated by dividing 2011 data by 2009 data.

c Natural regeneration = 2009 harvest minus 2011 artificial regeneration.

Source: National Forestry Database

Forest regeneration on provincial Crown lands across Canada, 2001–2011



Note: For "Area harvested," because there is typically a delay of two years between harvest and regeneration to allow for site preparation and provision of nursery stock, regeneration data are compared with harvest data from two years before.

Source: National Forestry Database

Role in global ecological cycles

Forests play an important role in supporting and maintaining global ecological cycles—cycles that are in turn critical to forests' sustainability.

Forests both depend on and contribute to the many and complex self-regulating processes that are responsible for recycling carbon, water, nitrogen and other life-sustaining elements. How forests are managed can affect their role in all of these cycles.

Carbon emissions/removals in Canada's managed forests

Why is this indicator important?

Carbon emissions to, and removals from, the atmosphere by Canada's managed forests are an important indication of the contribution our forests make to the global carbon cycle. These emissions and removals are also useful indicators of the ever-changing impacts of natural processes. As well, management activities aimed at increasing carbon stocks in Canada's forest ecosystems could help mitigate the effects of climate change. Therefore, monitoring trends in carbon emissions and removals is important for anticipating the future role of Canada's forests in the global carbon cycle, and for tracking the success of the forest sector's mitigation activities.

When forests, over a given period of time, remove more carbon from the atmosphere than they emit to the atmosphere through decomposition and combustion of woody material, they are said to be a net sink for atmospheric carbon. Conversely, when emissions exceed removals, the forest is said to be a net source of atmospheric carbon.

This indicator is estimated annually using the National Forest Carbon Monitoring, Accounting and Report System developed and maintained by Natural Resources Canada–Canadian Forest Service. This system integrates information about forest inventories, forest growth, natural disturbances, forest management activities and land-use change to evaluate carbon stocks, stock changes and emissions of non-CO_2 greenhouse gases in Canada's managed forests.[4]

What has changed and why?

In 2011, the managed forests acted as an overall net carbon source, releasing 84 million tonnes of carbon dioxide equivalent (CO_2e) to the atmosphere.

At the same time, however, these forests accumulated 42 million tonnes of carbon (154 million tonnes CO_2e) in forest biomass and dead organic matter. Another 36 million tonnes of carbon (130 million tonnes CO_2e) were transferred

4 "Managed land" includes all lands managed for production of wood-fibre or wood-based bioenergy, for protection from natural disturbances, or for the conservation of forest ecological values. Within those managed lands, "forest" includes all areas of 1 hectare or more having the potential to develop forest cover with a minimum crown closure of 25% and a minimum tree height of 5 metres at maturity *in situ*.

from the forest into forest products by converting harvested timber into wood-based commodities.

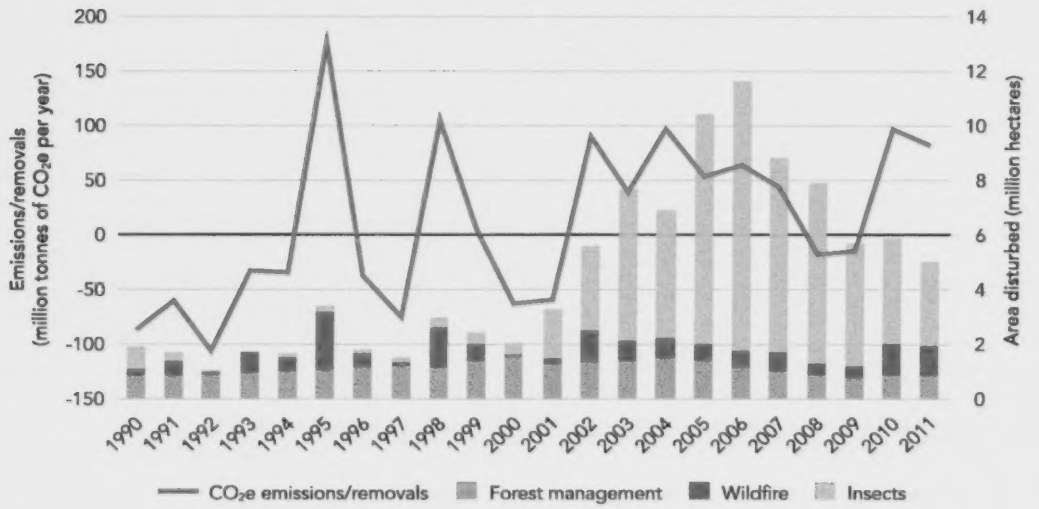
Canada's managed forests have acted as a net carbon sink in 11 of the 22 years from 1990 to 2011. However, it is difficult to discern an overall trend because forest carbon emissions and removals vary considerably from year to year as a result of wildfires and (to a lesser extent) insect epidemics.

Fire strongly influences between-year differences in carbon emissions and removals from Canada's managed forests. In 1992, a year of relatively few fires, greenhouse gas removals of CO_2e totalled 106 million tonnes. In 1995, when fire burned more than 2 million hectares, emissions of CO_2e reached 179 million tonnes. During the 1990–2011 period, annual emissions directly from wildfire ranged from a high of 264 million tonnes of CO_2e in 1995 to a low of 11 million tonnes in 2000. Wildfire disturbances in 2011 were significant, with over 1 million hectares burned, contributing 156 million tonnes of CO_2e emissions to the net carbon balance of Canada's managed forests.

What is the future outlook?

The annual carbon balance of Canada's managed forest is highly variable from year to year, as shown in the graph. The annual carbon balance results from a complex interaction of many factors, and the substantial uncertainties associated with predicting the future behaviour of any one of these factors—let alone their interactions—make the future outlook for this indicator difficult to assess. The Canadian Wildland Fire Information System reported 1.8 million hectares burned in 2012 (as of September 2012), which suggests that 2012 *may* be another year of significant fire emissions. However, neither the total area burned within the managed forest nor the total amount of woody material consumed is available yet for 2012.

Carbon emissions/removals in Canada's managed forests, 1990–2011



Source: Natural Resources Canada, Canadian Forest Service

Forest sector carbon emissions

Why is this indicator important?

Most experts agree that there is a strong link between climate change and activities that burn fossil fuels and emit carbon dioxide, methane, nitrous oxide and other greenhouse gases (GHGs). Fossil fuels include coal, refined petroleum products and natural gas.

Through harvesting, transporting and processing wood, the forest sector is one of the largest industrial users of energy in Canada. However, the sector's share of total GHG industrial emissions is considerably lower than its share of total industrial energy use because of its increasing use of bioenergy.

The sector's GHG emissions include *direct emissions*, which result mainly from burning fossil fuels, and *indirect emissions*, which result mainly from burning fossil fuels to produce electricity purchased by the sector. The sector's direct and indirect emissions also include small amounts of methane and nitrous oxide from burning biomass for energy.

Monitoring the forest sector's GHG emissions is a necessary first step in improving its emissions record. As well, tracking emissions in the forest sector helps Canada measure its national emission levels and assess how these compare with its targets for GHG reductions.

What has changed and why?

A changing energy mix and greater energy efficiency are clearly reducing GHG emissions in the forest sector.

Note: The survey method used to inform *Canada's Report on Energy Supply and Demand* was changed in 2011, affecting the estimates for 2008–2009, and the 2012 updates to the time series data have affected the 1990–2009 data. These changes have directly affected the estimates for industrial energy use and electricity generation, and indirectly affected the emissions estimates. The time series data for 1990–2010 may therefore not be completely consistent with data for earlier years.

Between 1990 and 2010, the sector's contribution to the Canadian economy decreased. Much of the decline occurred between 2005 and 2010, and was tied to the decline in the U.S. housing market and to the global economic recession. In the same period, the industry's energy use fell by 30% as energy efficiency also improved.

In 1990, fossil fuels accounted for 38% of the forest sector's direct and indirect energy needs. The other 62% of energy needs were met by bioenergy, hydroelectricity and nuclear power. By 2010, the fossil fuel share had fallen to 28% while the share of alternative fuels rose to 72%.

This switch in fuel types, together with increasing energy efficiency and reduced energy use during the global economic recession, resulted in the sector's overall GHG emissions falling by 48% between 1990 and 2010.

The forest sector's substantial cut in fossil fuel usage between 1990 and 2010 has helped reduce direct emissions by 49%. The forest sector's ability to self-generate electricity, largely from bioenergy, has reduced its reliance on electricity generated from fossil fuels and resulted in an 18% decrease in indirect emissions from electricity consumed by the sector over the same time period.

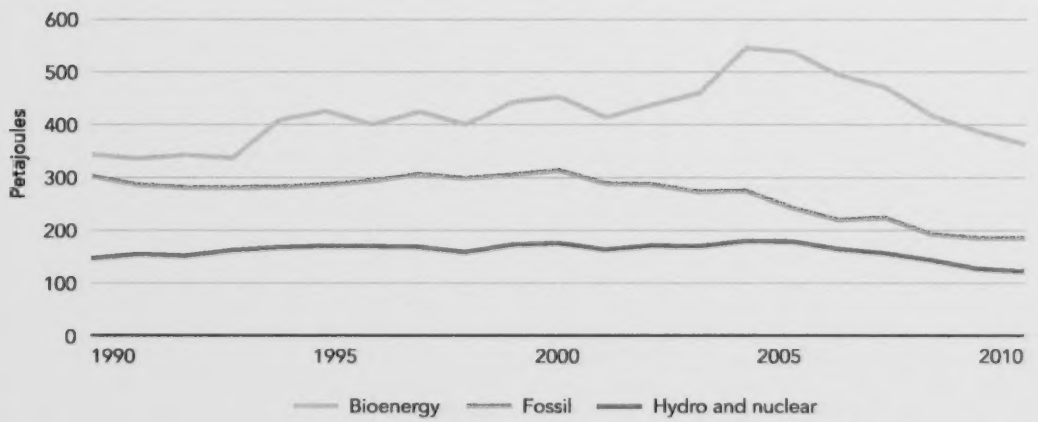
In 2009, the federal government announced the $1-billion Pulp and Paper Green Transformation Program, a three-year initiative that provided pulp and paper companies in Canada with one-time access to funding to make environmental improvements to facilities, including improved energy efficiency and increased production of renewable energy. The program, which ended on March 31, 2012, demonstrated success on all counts, helping the country's pulp and paper mills improve their environmental and economic sustainability and be ready to tackle the next phase of transformation.

What is the future outlook?

As a result of recent investments under the Pulp and Paper Green Transformation Program in forest industry projects aimed at reducing emissions, the forest sector can expect to see decreases in energy use, water use and emissions per unit produced. In particular, the projects completed under this program are expected to enable mills to:

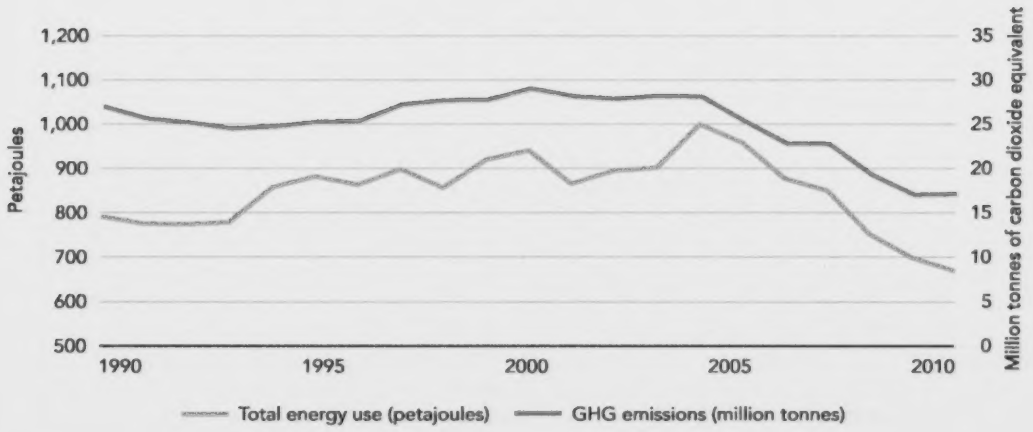
- self-generate enough renewable electricity to continuously power 140,000 homes
- eliminate 8.5 million gigajoules of energy consumed per year as a result of energy efficiency improvements
- decrease emissions of GHGs, particulates and odour-causing gases (the GHG emissions of the entire Canadian pulp and paper industry will be cut by more than 10% from 2009 levels)
- decrease water use, effluent discharge and the amount of waste sent to landfills

Energy sources in Canada's forest sector, 1990–2010



Source: Natural Resources Canada, Energy Sector, Office of Energy Efficiency

Fossil fuel greenhouse gas (GHG) emissions and total energy use in Canada's forest sector, 1990–2010



Source: Natural Resources Canada, Energy Sector, Office of Energy Efficiency

Economic and social benefits

Sustainable forest management means ensuring that forests provide a broad range of goods and services over the long term, including significant economic and social benefits.

Annual harvest of timber relative to the level of harvest deemed to be sustainable

Why is this indicator important?

Sustainable wood supply is the term used to describe the estimated volume of timber that can be harvested from an area while meeting environmental, economic and social objectives. Tracking harvest volumes allows forest managers to determine whether these amounts fall within sustainable wood supply levels.

In Canada, various planning processes are used to estimate wood supply, depending on the forest land's ownership and the regulatory environment.

Provincial governments regulate harvest levels on provincial Crown lands by specifying an annual allowable cut (AAC), which is the annual level of harvest allowed on a particular area of Crown land over a specified number of years. In practice, annual harvest volumes may be above or below the AAC, but they must balance out over the regulation period. Although no AAC is determined for Canada as a whole, it is possible to compare the aggregation of the provincial AACs across the country with the aggregated harvest from the same land base. Because AACs are set based on an assessment of a range of environmental, economic and social factors, they are only a proxy for the sustainable level of harvest.

Harvest volumes on private, federal and territorial lands are not regulated in the same way. Although the managers of these lands may have commitments to meeting specific harvest targets, it is difficult to determine the sustainable level of harvest on these lands. To estimate Canada's total wood supply, provincial AACs on regulated lands are used as a proxy for wood supply on those lands, and wood supply on private, federal and territorial lands is estimated.

What has changed and why?

Provincial Crown lands

Canada's aggregate AAC for provincial Crown land in 2011 was an estimated 197 million cubic metres, made up of 154 million cubic metres of softwoods and 43 million cubic metres of hardwoods. This is slightly below the aggregate AAC estimated for 2010 and is the result of lower softwood AACs reported by a number of jurisdictions.

Although softwood harvests on provincial Crown land fluctuated between 1990 and 2004, they showed no real trend, averaging about 130 million cubic metres per year. Between 2004 and 2009, however, softwood harvests fell rapidly. This decline mirrored the sharp decline in U.S. housing starts, the main driver of demand for Canadian softwood lumber products. Since then, softwood

harvests have increased. By 2011, they were 30% greater than 2009 levels—although still significantly smaller than the volumes harvested in the 1990s and well below the aggregated softwood AAC.

The volume of hardwood timber harvested on provincial Crown land increased steadily between 1990 and 2004, peaking at 27 million cubic metres in 2004, well below the AAC. Similar to harvest volumes of softwoods, those for hardwoods declined rapidly between 2004 and 2009. This parallelled the decline in demand for hardwood products as a result of the economic downturn, before recovering to reach 20 million cubic metres in 2011—26% above 2009 levels but still well below the aggregated hardwood AAC.

Private, territorial and federal lands

In 2011, Canada's wood supply on private, territorial and federal lands was estimated to be 33 million cubic metres, of which 21 million cubic metres were softwoods and 12 million cubic metres were hardwoods. This is about 1 million cubic metres below the level estimated for 2010, and continues the downward trend in the estimated wood supply for these ownerships that began in 2006.

Private, territorial and federal lands contributed an additional 15 million cubic metres of softwoods and 5 million cubic metres of hardwoods to the total volume of timber harvested in 2011.

Trends in the indicator, all lands

Between 2002 and 2011, Canada's total wood supply on all land types (provincial, territorial, federal and private) averaged 242 million cubic metres annually. This included 183 million cubic metres of softwoods and 59 million cubic metres of hardwoods.

Over the same period, softwood harvests on all land types averaged 136 million cubic metres per year, 25% below the estimated wood supply. Significant declines in harvest as a result of the global economic downturn and related low demand for forest products began after 2004, and by 2009 less than half of the estimated wood supply was harvested. Although softwood harvests are steadily recovering, rising in 2010 and again in 2011, they remain well below the estimated wood supply.

Hardwood harvests on all land types over the past decade have averaged 29 million cubic metres per year, more than 50% below the average annual estimated wood supply. Similar to harvest volumes of softwoods, those for hardwoods began declining in 2004, also reaching their lowest levels in 2009. Although increasing in 2010 and again in 2011, current harvest volumes remain well below the estimated wood supply of 59 million cubic metres per year.

What is the future outlook?

This indicator demonstrates that Canada continues to harvest at levels below the estimated wood supply considered to be sustainable. Given the strong sustainable harvesting regulatory regimes in place across Canada, this trend is expected to continue.

In the medium term, the gap between harvested volume and sustainable timber volumes is expected to narrow. This change will be driven by the return of demand for solid wood products in the U.S., as well as reductions in available wood supply because of the mountain pine beetle in British Columbia and policy changes in central Canada.

Annual harvest and supply volumes of softwood and hardwood, 2011[a]

	Volume (million cubic metres)	Percentage change from previous year	Percentage change from the 10-year average[b]
Softwood supply	174.6	-3.2	-4.7
Softwood harvest	121.3	4.5	-12.9
Hardwood supply	55.5	-0.4	-6.7
Hardwood harvest	25.4	12.9	-15.0

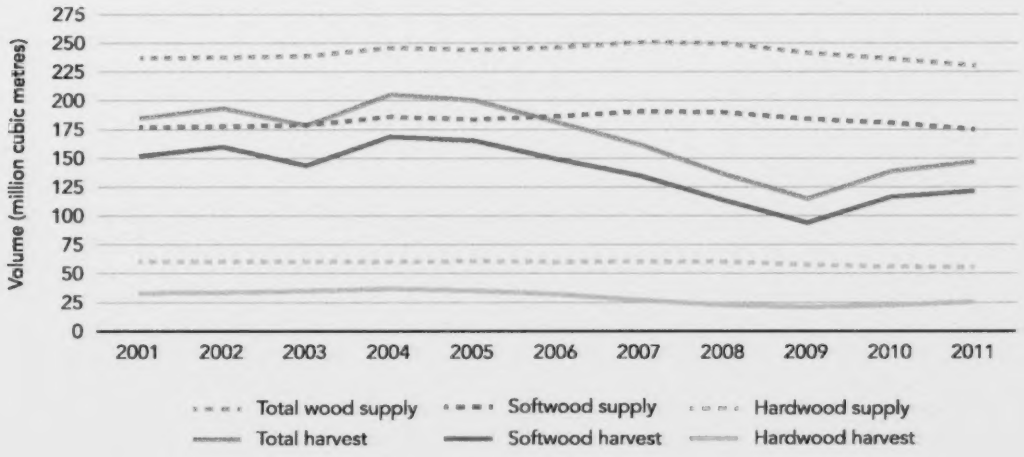
Note: Includes only industrial roundwood.

a Includes all land types (provincial, territorial, federal and private).

b Average over the period 2001–2010.

Source: National Forestry Database

Annual harvest versus supply deemed sustainable for harvest, 2001–2011[a]



a Includes all land types (provincial, territorial, federal and private).

Source: National Forestry Database

Contribution of forest products to gross domestic product

Why is this indicator important?

The gross domestic product (GDP) is the market value of all final goods and services produced annually in a country.

The contribution of the forest product sector relative to the entire Canadian GDP shows the importance of the forest industry to Canada.

The three subsectors of the Canadian forest product sector consist of wood product manufacturing (building products such as lumber and wood panels), forestry and logging (timber extraction, forest protection and regeneration), and pulp and paper manufacturing.

While still very small proportionally, emerging non-traditional products like bioenergy and biomaterials from wood fibre may not be fully captured by traditional measures of the contribution of the forest sector.

What has changed and why?

From 2005 to 2009, the forest product sector's share of GDP dropped significantly.

Until 2005, the contribution of the pulp and paper subsector (excluding newsprint) and solid wood subsector had been very stable. The U.S. housing crisis proved to be a severe challenge for the wood and logging subsectors, which declined to record lows in 2009. The recession in 2009 exacerbated this effect, as well as accelerating the consumer shift away from graphic paper (such as newsprint, flyers and office papers) towards electronic media.

Since 2009, the forest product sector's contribution to GDP has been stable, with continued decline in pulp and paper offsetting recovery in wood product manufacturing, forestry and logging. Recovery in these sectors has been fuelled primarily by strong domestic demand coupled with rapidly expanding Asian markets.

Important to understand is that this indicator reflects the performance of both the forest product sector and the Canadian GDP. For example, between 2000 and 2008, economic activity in the forest product sector shrank while the Canadian economy expanded. These trends together led to sharp declines in the percentage contribution of the sector to GDP. In 2009, the recession saw both the forest product sector and the overall Canadian economy decline, though the decline was more significant in the former. Then, with the relatively constant sector economic activity and slowly rising Canadian GDP occurring from 2010 to 2012, the percentage contribution to GDP stabilized.

This stabilization was assisted by federal programs that promote the transformation of the Canadian forest sector. Among these programs were those that support innovation (e.g., Investments in Forest Industry Transformation), enhance environmental performance (e.g., Pulp and Paper Green Transformation, Pilot-Scale Demonstration), and expand market opportunities (e.g., Canada Wood).

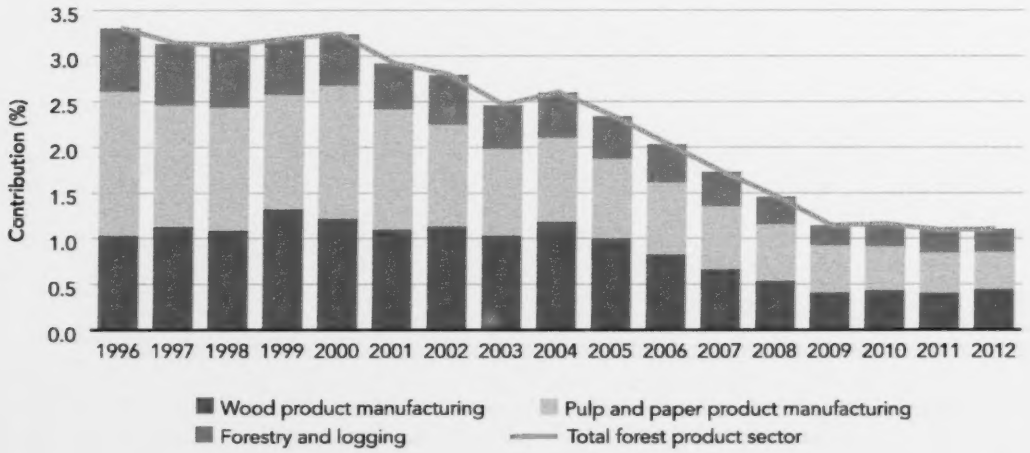
What is the future outlook?

The steady and accelerating recovery of the U.S. housing sector, along with continuing growth in Asia's market demand, suggests strong performance in the wood product manufacturing sector over the next decade. However, fibre supply limitations—resulting from the impact of the mountain pine beetle in Western Canada and tenure changes in Ontario and Quebec—will likely prevent a return to previous levels of GDP contribution by the forest sector.

Within the pulp and paper sector, the outlook is bright for certain products (such as various chemical pulps), but less so for graphic papers, whose contribution is expected to continue to decline with the shift to electronic media.

Ongoing industry transformation, underway through private- and public-sector partnerships, is expected to add new contributions from non-traditional bioproducts, biofuels and bioenergy.

Forest product sector contribution to GDP in Canada, 1996–2012



Source: Statistics Canada, gross domestic product at basic prices, by North American Industry Classification System (2002)

Financial performance

Why is this indicator important?

Canada's forest industry contributes significantly to the nation's economy. It is particularly important in many rural communities, where other industries and types of employment can be scarce. Financial performance is critical to the long-term viability of Canada's forest industry. A forest industry with healthy financial performance attracts the investment necessary to remain competitive in the long term, maintaining the economic sustainability of local communities.

Key measures of the forest industry's financial performance include *operating profits* and *return on capital employed*. High operating profits indicate that an industry's core business activity is in good health. High return on capital employed indicates that the industry is using its capital efficiently. Both identify an industry as an attractive investment opportunity, while also reflecting a sector's position relative to international competitors.

What has changed and why?

Canadian forest industry operating profits stood at $0.9 billion in 2012, down 45% from profits in 2011. Nevertheless, this still represents a considerable rebound compared with the negative operating profits recorded in 2008 and 2009. The return on capital employed reached 5% in 2012. While lower than the 6.2% of 2011, it remains above the long-term average (4.8%) of the past 15 years.

The relatively weak operating profits in 2012 were primarily the result of cyclical factors affecting global pulp markets and the ongoing impact of electronic media on printing and writing papers. This partially offset gains from the recovery of wood product markets. However, the relatively strong return on capital employed highlights the success of industry-wide efforts to improve efficiency.

What is the future outlook?

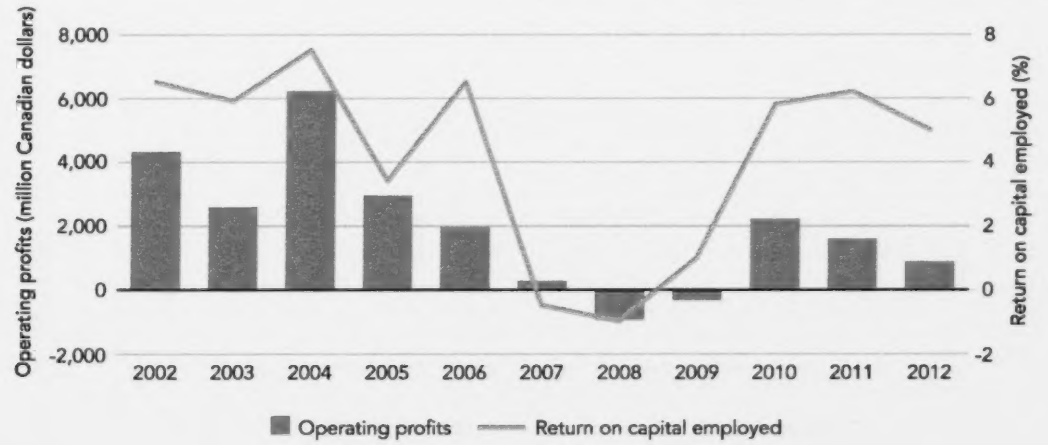
Though the recent challenges facing the paper sector are expected to continue, steadily improving North American and overseas wood product markets are likely to positively impact the financial performance of the forest industry in the short to medium term.

Return on capital employed, as a percentage, in 2002, 2011 and 2012

	2002	2011	2012
Return on capital employed	6.5%	6.2%	5.0%

Source: Statistics Canada, quarterly financial statistics for enterprises, CANSIM Table 187-0002 (special extraction)

Financial performance by Canada's forest sector, 2002–2012



Source: Statistics Canada, quarterly financial statistics for enterprises, CANSIM Table 187-0002 (special extraction)

Forest industry employment

Why is this indicator important?

The Canadian forest industry is a major employer nationwide. While the forest industry contributes to the economic, environmental and social welfare of all Canadians, these contributions are particularly important in many rural and Aboriginal communities, where forest-related work is often the main source of income.

In addition to *direct employment*,[5] which refers to jobs directly related to the production of forest products, the forest industry also provides *indirect employment* and *induced employment*. These jobs are especially significant in smaller forest-dependent communities. Indirect employment includes jobs necessary for forest industry activity but which occur outside the industry itself, such as investors, truckers and equipment manufacturers. Induced employment includes jobs created when those employed in forest industry activities use their wages to purchase consumer goods and services.

What has changed and why?

In 2012, direct employment in the Canadian forest industry rose slightly (by 0.9%) compared with 2011 levels, to 235,900 jobs. This was due mostly to employment increases in the wood product manufacturing sector and supporting activities, which more than offset declines in the pulp and paper product manufacturing sector.

Employment in wood product manufacturing was up 3.2%, and remained the largest share of employment in the Canadian forest industry (49.1%). This is a clear signal that the wood product manufacturing sector has started to recover, thanks to the rebound of the U.S. housing market and robust offshore lumber exports, particularly to China. In-forest activities responded strongly to improvements in the wood product manufacturing sector, up 11.6% in 2012 compared to 2011.

Employment in the pulp and paper product manufacturing sector, however, was down 9.2% in 2012 from 2011. This decline was the result of the enormous challenges that face this sector, which include the structural decline of newsprint and printing and writing papers due to the rise of electronic media and to a cyclical slowdown in global pulp markets.

Indirect and induced employment in the forest industry in 2012 was an estimated 363,700 jobs. These were spread across all regions of Canada, and followed trends similar to those for direct employment.

What is the future outlook?

With lumber and wood panel markets continuing to improve, it is likely that there will be further employment increases in wood product manufacturing in 2013. Meanwhile, as challenges facing the pulp and paper manufacturing industry still exist, the downward pressure on employment in this sector will likely remain. Overall continued modest improvement in employment through 2013 is expected.

5 While indirect and induced employment are also important elements of forest industry employment, this analysis focuses mainly on direct employment because of data availability.

Employment (person-years) in the forest industry, 2002 and 2012

Employment	2002	2012
Direct	355,500	235,900
Indirect and induced[a]	548,100	363,700
Total	**903,600**	**599,600**

a Estimate calculated by the Canadian Forest Service based on data from Statistics Canada, Labour Force Survey.

Source: Statistics Canada, Labour Force Survey, March 2013 (special extraction)

Direct employment in the forest industry, by forest-related subsector, 2012

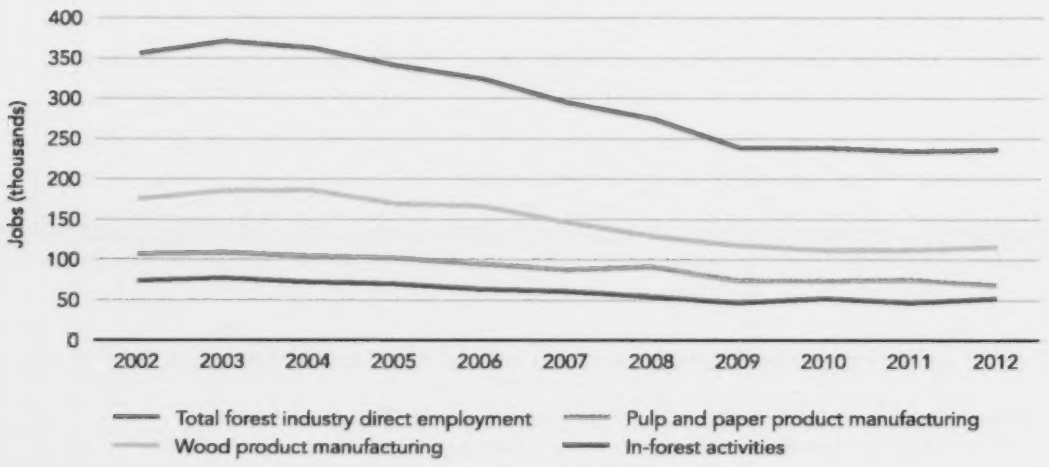
Subsector	Employment (person-years)	Percentage change from previous year[a]	Average annual percentage change over previous 10 years[b]
Wood product manufacturing	115,900	3.2	-4.1
Pulp and paper product manufacturing	68,200	-9.2	-4.3
In-forest activities	51,800	11.6	-3.5
Total	**235,900**	**0.9**	**-4.0**

a Percentage change calculated based on raw data.

b The period 2002–2012.

Source: Statistics Canada, Labour Force Survey, March 2013 (special extraction)

Forest industry direct employment, 2002–2012



Source: Statistics Canada, Labour Force Survey, March 2013 (special extraction)

Forest product exports

Why is this indicator important?

Canada's forest industry contributes substantially to the Canadian economy and forms the economic backbone of many rural communities. By value, Canada is the world's leading exporter of softwood lumber, newsprint and wood pulp. Together, forest product exports significantly improve Canada's balance of trade.

What has changed and why?

In 2012, the value of Canada's forest product exports fell by 4.5% from 2011 levels—to $25.1 billion from $26.3 billion.

Canadian softwood lumber exports continued to recover in 2012, up 10.8% from 2011 and surpassing $5.7 billion. This resurgence was driven primarily by a 22% increase in shipments to U.S. markets. As a result of both rising prices and increased volumes exported—spurred by the ongoing U.S. housing recovery—structural wood panel exports in 2012 increased in value by 24.7%, reaching $1.5 billion.

However, the increase of solid wood products exports was offset by the decline of pulp and paper products exports. In 2012, wood pulp, newsprint, and printing and writing paper exports were down 10.8%, 16.5% and 6.5%, respectively, from 2011. While the pulp export decline is a cyclical occurrence, export declines in newsprint and some printing and writing papers are the result of the rise of electronic media and represent a structural change.

Important to note is that though the export value of wood pellets for bioenergy production is still relatively small ($208 million in 2012), total wood pellet exports have been rapidly increasing in recent years, highlighting the potential of emerging products to add revenue streams to the sector.

What is the future outlook?

Strong growth of exports to emerging economies such as those of China and India has reduced the Canadian forest industry's reliance on U.S. markets. U.S. markets accounted for 63.1% of total Canadian forest products exports in 2012, compared with 79.7% in 2002. At the same time, the share of exports to China jumped from 1.8% in 2002 to 16.3% in 2012. Over the same period, the share of exports to India rose to 1.3% from 0.4%.

With strong demand in emerging economies for a variety of forest products, and with the support of market development initiatives such as the Canada Wood program, Canada is expected to continue to derive significant benefits from overseas markets over the medium term, although the U.S. will remain by far the single most important export market for Canada's forest industry.

Export statistics by forest product type, 2012

Forest product exports	Value (billion dollars)	Percentage change from previous year	Average annual percentage change over previous 10 years[a]
Wood pulp	6.4	-10.8	-0.8
Softwood lumber	5.7	10.8	-5.8
Newsprint	2.3	-16.5	-9.5
Printing and writing paper[b]	2.4	-6.5	-7.2
Structural wood panels	1.5	24.7	-7.5
Other forest products[c]	6.7	-8.5	-5.0
Total all forest products[c]	**25.1**	**-4.5**	**-5.3**

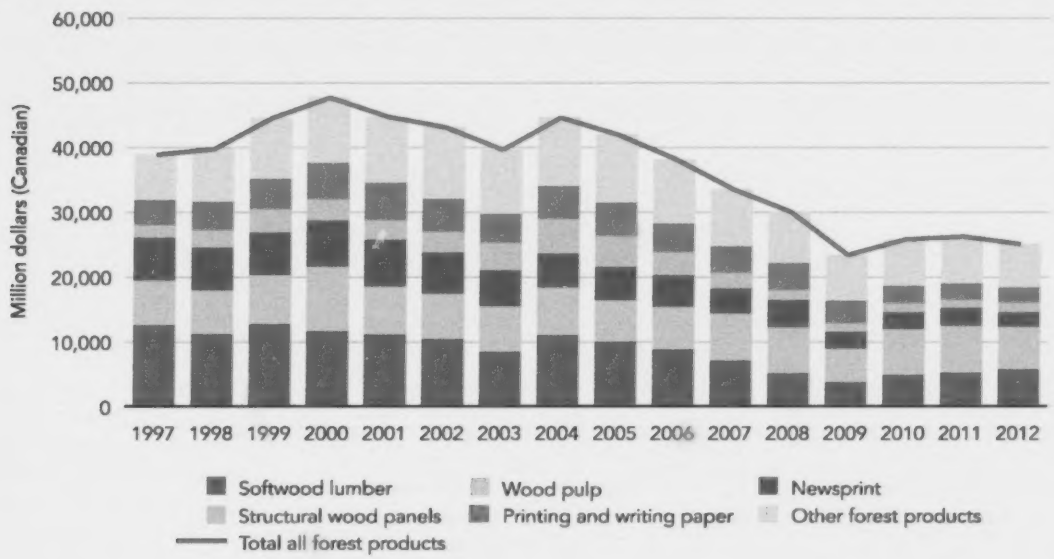
a The period 2002–2012.

b Estimate calculated by the Canadian Forest Service based on data for the past five years from the Pulp and Paper Products Council.

c Excludes non-timber forest products except Christmas trees.

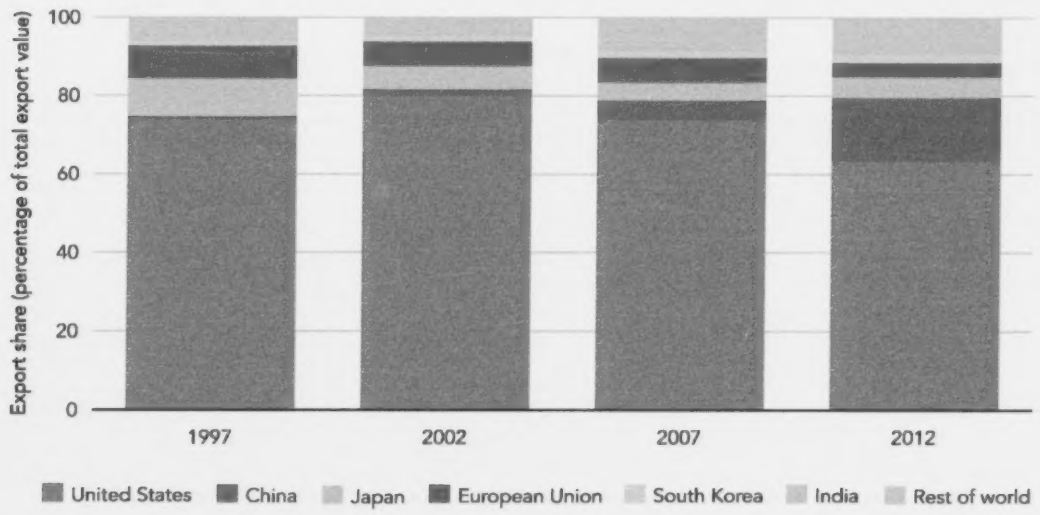
Source: Statistics Canada, merchandise trade data, monthly

Canadian forest product exports, 1997–2012



Source: Statistics Canada, merchandise trade data, monthly

Canadian forest product export destinations, 1997–2012



Source: Statistics Canada, merchandise trade data, monthly

Society's responsibility

Extensive forestry operations take place on Canada's public lands, and many rural communities depend on the forest for their well-being. It is therefore essential that forest practices reflect society's economic, social and cultural values.

Forest-dependent communities in Canada

Why is this indicator important?

The forest industry is the main economic driver in nearly 200 Canadian rural communities. In these communities, where a large proportion of workers and revenue is linked to the forest sector, social and economic well-being is highly dependent on the economic strength of the sector. This means that when the sector faces cyclical or structural challenges, community well-being can suffer.

The influence of the forest sector is also felt in communities with a broad economic base. Even when communities are not technically forest dependent, they can experience the ups and downs of the sector's cyclical and structural shifts. Especially vulnerable to these effects are many of Canada's First Nations communities, more than 80% of which are in or near forested areas.

What has changed and why?

Between the 2001 census and 2006 census (most recent data available[6]), the number of rural communities in Canada where the forest industry is the main economic driver fell from approximately 300 to fewer than 200.

The primary cause of this drop was the overall economic decline in the forest sector. Factors contributing to this decline include the strong Canadian dollar, greater global competition, a fall in U.S. housing starts and the impacts of the mountain pine beetle infestation.

Although some of these regions have suffered significantly in recent years, quality-of-life indicators show that, as a group, both current and former forest-dependent communities have seen no decline in well-being. Job growth in other sectors, particularly other resource sectors, has helped temper the impact of job losses in forestry. Many communities are also diversifying their economies—for example, by developing a range of non-timber forest-related values such as recreation, ecotourism and bioenergy.

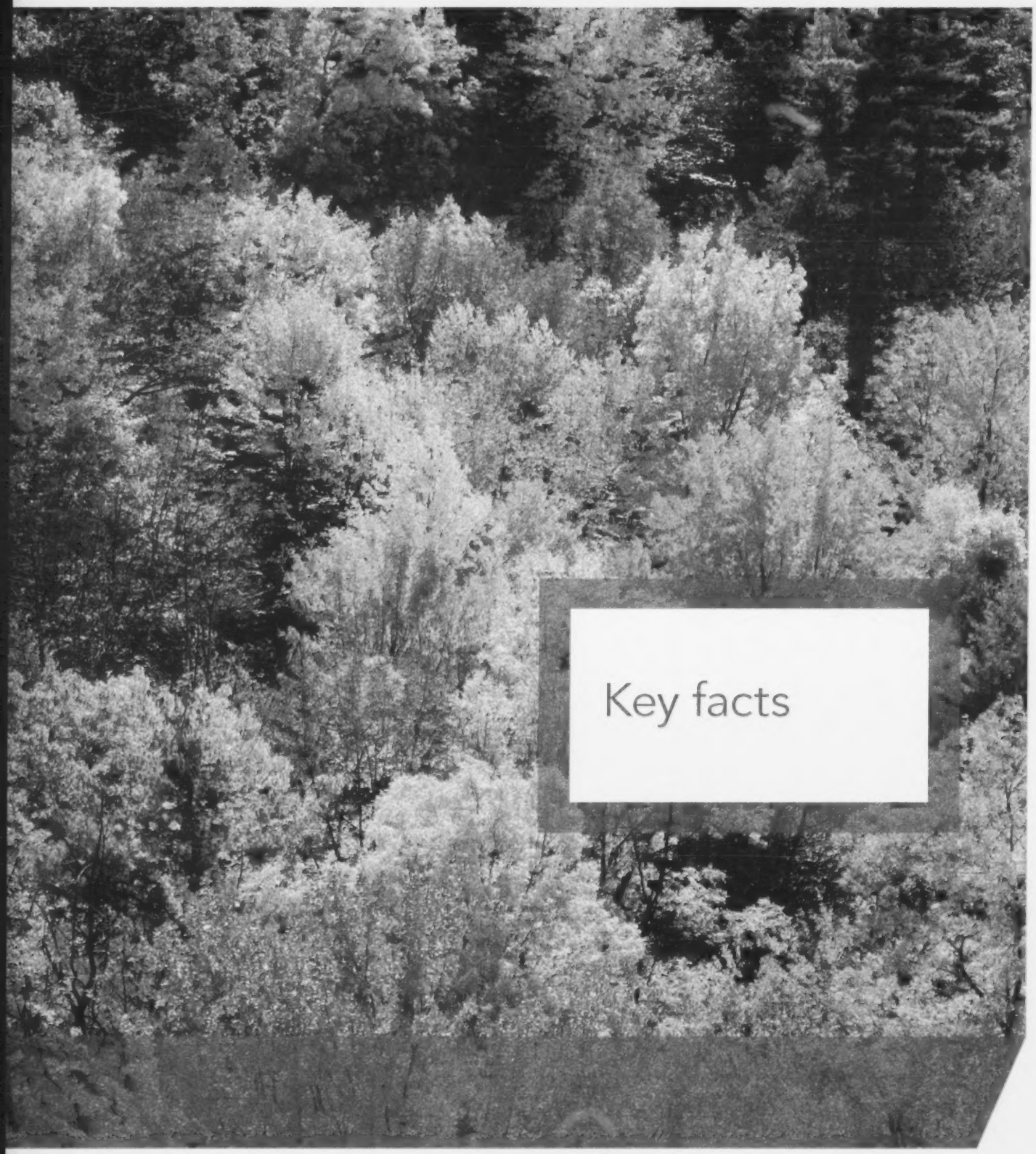
6 The relevant data from the 2011 census are not yet available.

What is the future outlook?

As the forest sector continues to recover, new types of employment opportunities are becoming available across Canada.

Natural Resources Canada–Canadian Forest Service (NRCan–CFS) is working with forest-dependent communities to help them better position themselves to take advantage of this recovery and to access the resulting opportunities. For example, between 2011 and 2013, NRCan–CFS's Aboriginal Forestry Initiative invested $4.6 million to support Aboriginal communities in acting on regional forest-based economic development opportunities.

While it is difficult to predict future trends for this indicator, overall it is expected that forestry will remain an important sector for many Canadians.



Key facts

Society

Most of Canada's forest land (90%) is owned and managed on behalf of Canadians by provincial and territorial governments (public land). Two percent of forest land is under federal jurisdiction and 2% is owned and managed by Aboriginal peoples. The remaining 6% of forest land is on private property.

The provinces and territories have legislative authority over the conservation and management of the forest resources on the Crown land in their jurisdictions.

The federal government has legislative authority over forest resources where those resources affect, or are affected by, matters related to the national economy, trade and international relations; federal lands and parks; and the government's constitutional, treaty, political and legal responsibilities for Aboriginal peoples.

In 2012, direct employment in the Canadian forest industry rose slightly (by 0.9%) from 2011.

For about 200 communities across Canada, the forest sector makes up at least 50% of the economic base.

About 80% of all Aboriginal communities in Canada are in forested areas.

Public participation is an important aspect of forest management planning in Canada.

Economy

By value, Canada is the world's leading exporter of softwood lumber, newsprint and wood pulp.

The forest industry contributes about 1.1% to Canada's gross domestic product.

The United States is by far the largest buyer of Canadian forest products.

Environment

Canada has 396.9[7] million hectares of forest, other wooded land and other land with tree cover. This represents 10% of the world's forest cover, 30% of the world's boreal forest and 39% of Canada's land area.

Less than 0.2% of Canada's forests are harvested annually.

By law, all forests harvested on Canada's public land must be successfully regenerated.

As of December 2012, Canada had 147.9 million hectares of forests certified as being sustainably managed under one or more of three globally recognized certification systems.

Bioenergy accounts for 54% of the total energy used by the forest industry, with the pulp and paper sector meeting some 58% of its energy needs from forest biomass.

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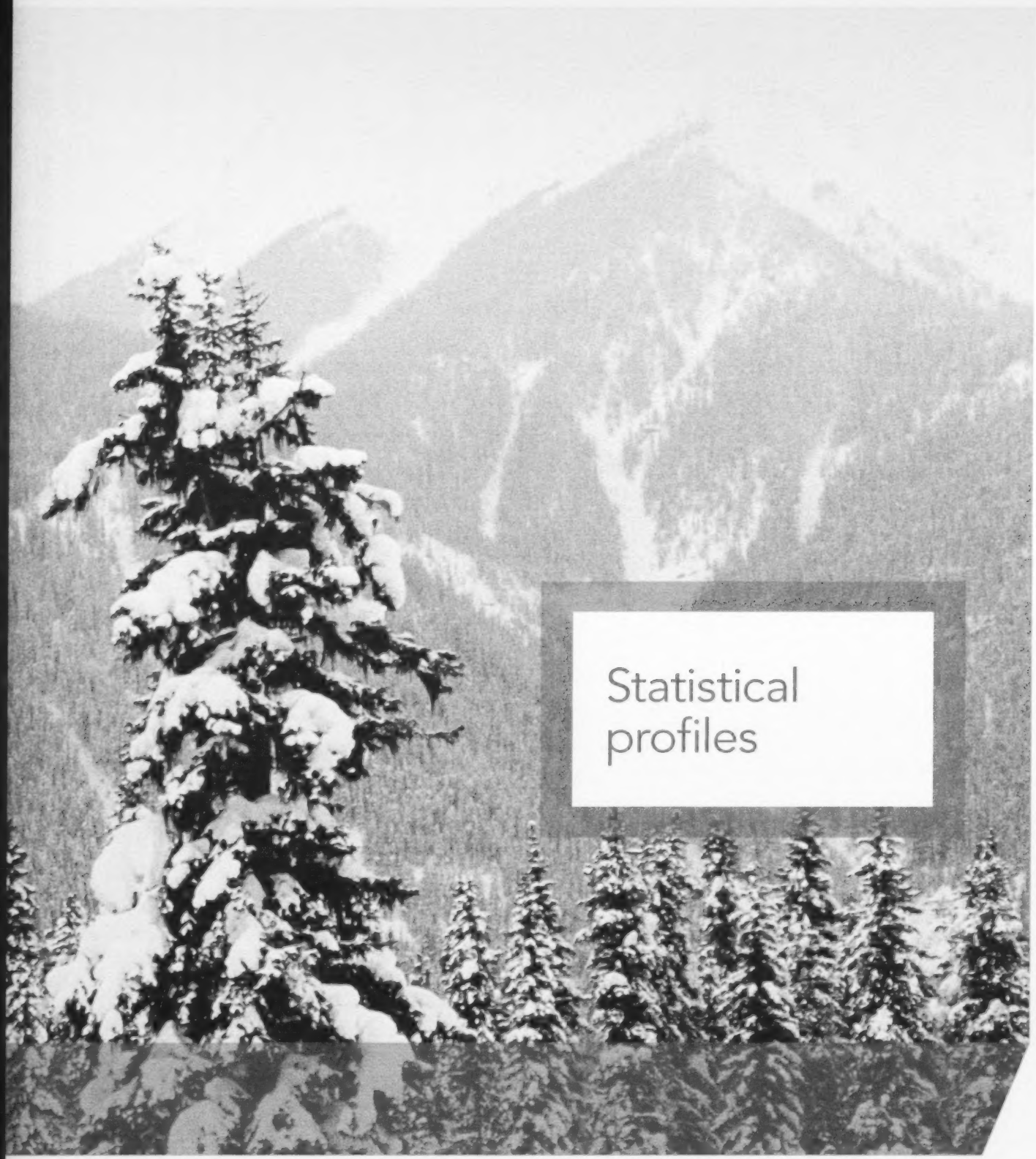
7 The area of forest, other wooded land and other land with tree cover reported this year is 396.9 million ha (it was 397.3 million ha in 2012). This 362,000-ha reduction does not mean deforestation is increasing or forest area is decreasing. Rather, it reflects minor changes in data and improved statistical estimation procedures in the National Forest Inventory baseline.



Statistical profiles

Canada

Population (April 1, 2013) • 35,141,542 Maple

DOMESTIC ECONOMIC IMPACT

Canadian housing starts (2012)	214,827
Contribution to nominal GDP (current dollars) (2012)	**18,700,000,000**
Forestry and logging industry	4,300,000,000
Pulp and paper product manufacturing industry	6,900,000,000
Wood product manufacturing industry	7,500,000,000
Direct jobs (number) (2012)	
Labour Force Survey	235,900
Survey of Employment, Payrolls and Hours	184,811
Expenditures—capital (dollars) (2012)	**2,265,200,000**
Forestry and logging industry	232,800,000
Pulp and paper product manufacturing industry	1,277,800,000
Wood product manufacturing industry	754,600,000
Expenditures—repair (dollars) (2011)	**2,606,100,000**
Forestry and logging industry	259,300,000
Pulp and paper product manufacturing industry	1,444,100,000
Wood product manufacturing industry	902,700,000
Revenue from goods manufactured (dollars) (2011)	**53,263,638,000**
Forestry and logging industry	8,569,730,000
Pulp and paper product manufacturing industry	24,752,105,000
Wood product manufacturing industry	19,941,803,000
Wages and salaries (dollars) (2011)	**8,719,191,000**
Forestry and logging industry	1,404,021,000
Pulp and paper product manufacturing industry	3,434,710,000
Wood product manufacturing industry	3,880,460,000

FOREST MANAGEMENT

Area defoliated by insects and containing beetle-killed trees (hectares) (2011)	9,193,488
Area planted (hectares) (2011)	370,636
Area seeded (hectares) (2011)	11,221
Fire—area burned (hectares) (2012)	1,921,371
Fires—number (2012)	7,288
Forest area certified (hectares) (2012)	147,928,855
Harvest area (hectares) (2011)	637,809
Harvest volume (cubic metres) (2011)	148,619,000

GREENHOUSE GAS INVENTORY

For forest lands affected by land-use change (2011)	
Afforestation—forest area (kilohectares)	Not available
CO_2e removals from the atmosphere due to afforestation (megatonnes)	0.7
Deforestation—forest area (kilohectares)	45.9
CO_2e emissions due to deforestation (megatonnes)	11.6
For managed forests (2011)	
Area of managed forests (million hectares)	229
Net greenhouse gas release to the atmosphere (CO_2e/yr) (megatonnes)	83.9
Net removals due to forest biomass and dead organic matter (CO_2e/yr) (megatonnes)	154

FOREST PRODUCTS

Domestic consumption	
Lumber—hardwood (cubic metres) (2012)	2,156,211
Lumber—softwood (cubic metres) (2012)	21,905,386
Newsprint (tonnes) (2012)	818,977
Printing and writing paper (tonnes) (2012)	1,322,000
Structural panels (plywood and oriented strandboard) (cubic metres) (2012)	3,772,329
Wood pulp (tonnes) (2012)	7,449,082
Production	
Christmas trees (dollars) (2011)	39,438,000
Christmas trees (number) (2011)	1,838,000
Lumber—hardwood (cubic metres) (2012)	1,297,600
Lumber—softwood (cubic metres) (2012)	54,722,600
Maple products (dollars) (2011)	349,504,000
Maple products (litres) (2011)	50,109,000
Newsprint (tonnes) (2012)	3,874,000
Printing and writing paper (tonnes) (2012)	3,319,000
Structural panels (plywood and oriented strandboard) (cubic metres) (2012)	6,695,153
Wood pulp (tonnes) (2012)	17,079,000

INVENTORY

Area classification (million hectares)	
Forest land	347.6
Other land with tree cover	8.5
Other wooded land	40.9
Forest, other wooded land and other land with tree cover	**396.9**
Forest type (forest land)	
Broadleaf	10.5%
Coniferous	67.8%
Mixedwood	15.8%
Non-treed	5.9%
Ownership (forest land)	
Aboriginal	2.0%
Federal	1.6%
Municipal	0.3%
Private	6.2%
Provincial	76.6%
Territorial	12.9%
Other	0.4%

TRADE

Balance of trade (total exports) (dollars) (2012)	16,326,222,269
Value of domestic exports (dollars) (2012)	**25,077,709,595**
Primary wood products	1,024,889,707
Pulp and paper products	15,125,924,298
Wood-fabricated materials	8,926,895,590
Value of imports (dollars) (2012)	**8,900,688,235**
Primary wood products	420,120,787
Pulp and paper products	5,768,311,902
Wood-fabricated materials	2,712,255,546

See page 52 for background information and sources for the statistics presented in these tables.

British Columbia

Population (April 1, 2013) • 4,650,004

Western redcedar

DOMESTIC ECONOMIC IMPACT	
Direct jobs (number) (2012)	
Labour Force Survey	56,600
Survey of Employment, Payrolls and Hours	46,484
Expenditures—capital (dollars) (2012)	**566,900,000**
Forestry and logging industry	97,100,000
Pulp and paper product manufacturing industry	270,400,000
Wood product manufacturing industry	199,400,000
Housing starts (2012)	**27,465**
Revenue from goods manufactured (dollars) (2011)	**15,431,794,000**
Forestry and logging industry	3,814,124,000
Pulp and paper product manufacturing industry	4,821,780,000
Wood product manufacturing industry	6,795,890,000
Wages and salaries (dollars) (2011)	**2,426,204,000**
Forestry and logging industry	619,820,000
Pulp and paper product manufacturing industry	592,151,000
Wood product manufacturing industry	1,214,233,000

FOREST MANAGEMENT	
Area defoliated by insects and containing beetle-killed trees (hectares) (2011)	7,031,183
Area planted (hectares) (2011)	152,985
Area seeded (hectares) (2011)	Not available
Fire—area burned (hectares) (2012)	53,836
Fires—number (2012)	1,385
Forest area certified (hectares) (2012)	51,877,536
Harvest area (hectares) (2011)	174,624
Harvest volume (cubic metres) (2011)	69,204,000

TRADE	
Balance of trade (total exports) (dollars) (2012)	8,616,616,245
Value of domestic exports (dollars) (2012)	**10,037,810,421**
Primary wood products	853,324,251
Pulp and paper products	3,984,760,900
Wood-fabricated materials	5,199,725,270
Value of imports (dollars) (2012)	**1,431,191,684**
Primary wood products	50,807,322
Pulp and paper products	666,399,499
Wood-fabricated materials	713,984,863

Alberta

Population (April 1, 2013) • 3,965,339

Lodgepole pine

DOMESTIC ECONOMIC IMPACT	
Direct jobs (number) (2012)	
Labour Force Survey	18,700
Survey of Employment, Payrolls and Hours	18,400
Expenditures—capital (dollars) (2012)	**364,100,000**
Forestry and logging industry	26,900,000
Pulp and paper product manufacturing industry	165,700,000
Wood product manufacturing industry	171,500,000
Housing starts (2012)	**33,396**
Revenue from goods manufactured (dollars) (2011)	**Not available**
Forestry and logging industry	867,074,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	2,417,466,000
Wages and salaries (dollars) (2011)	**Not available**
Forestry and logging industry	134,926,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	524,468,000

FOREST MANAGEMENT	
Area defoliated by insects and containing beetle-killed trees (hectares) (2011)	748,740
Area planted (hectares) (2011)	60,061
Area seeded (hectares) (2011)	1,668
Fire—area burned (hectares) (2012)	392,982
Fires—number (2012)	1,425
Forest area certified (hectares) (2012)	20,040,976
Harvest area (hectares) (2011)	81,514
Harvest volume (cubic metres) (2011)	25,503,000

TRADE	
Balance of trade (total exports) (dollars) (2012)	1,850,850,210
Value of domestic exports (dollars) (2012)	**2,141,627,441**
Primary wood products	24,634,536
Pulp and paper products	1,596,143,255
Wood-fabricated materials	520,849,650
Value of imports (dollars) (2012)	**291,648,836**
Primary wood products	6,813,334
Pulp and paper products	133,766,035
Wood-fabricated materials	151,069,467

Saskatchewan

Population (April 1, 2013) • 1,093,880 | White birch

DOMESTIC ECONOMIC IMPACT	
Direct jobs (number) (2012)	
Labour Force Survey	3,500
Survey of Employment, Payrolls and Hours	Not available
Expenditures—capital (dollars) (2012)	**Not available**
Forestry and logging industry	3,100,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	Not available
Housing starts (2012)	**9,968**
Revenue from goods manufactured (dollars) (2011)	**Not available**
Forestry and logging industry	55,147,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	228,165,000
Wages and salaries (dollars) (2011)	**Not available**
Forestry and logging industry	13,982,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	60,605,000

FOREST MANAGEMENT	
Area defoliated by insects and containing beetle-killed trees (hectares) (2011)	116,983
Area planted (hectares) (2011)	3,116
Area seeded (hectares) (2011)	Not available
Fire—area burned (hectares) (2012)	231,806
Fires—number (2012)	395
Forest area certified (hectares) (2012)	4,115,849
Harvest area (hectares) (2011)	14,774
Harvest volume (cubic metres) (2011)	2,180,000

TRADE	
Balance of trade (total exports) (dollars) (2012)	303,604,792
Value of domestic exports (dollars) (2012)	**377,181,661**
Primary wood products	2,732,473
Pulp and paper products	202,787,554
Wood-fabricated materials	171,661,634
Value of imports (dollars) (2012)	**73,583,681**
Primary wood products	1,812,091
Pulp and paper products	38,613,830
Wood-fabricated materials	33,157,760

Manitoba

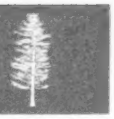
Population (April 1, 2013) • 1,277,339 | White spruce

DOMESTIC ECONOMIC IMPACT	
Direct jobs (number) (2012)	
Labour Force Survey	5,100
Survey of Employment, Payrolls and Hours	Not available
Expenditures—capital (dollars) (2012)	**Not available**
Forestry and logging industry	500,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	Not available
Housing starts (2012)	**7,242**
Revenue from goods manufactured (dollars) (2011)	**741,248,000**
Forestry and logging industry	43,755,000
Pulp and paper product manufacturing industry	349,473,000
Wood product manufacturing industry	348,020,000
Wages and salaries (dollars) (2011)	**160,763,000**
Forestry and logging industry	9,206,000
Pulp and paper product manufacturing industry	66,649,000
Wood product manufacturing industry	84,908,000

FOREST MANAGEMENT	
Area defoliated by insects and containing beetle-killed trees (hectares) (2011)	1,473
Area planted (hectares) (2011)	5,057
Area seeded (hectares) (2011)	Not available
Fire—area burned (hectares) (2012)	228,951
Fires—number (2012)	449
Forest area certified (hectares) (2012)	10,620,309
Harvest area (hectares) (2011)	7,576
Harvest volume (cubic metres) (2011)	1,243,000

TRADE	
Balance of trade (total exports) (dollars) (2012)	-71,806,955
Value of domestic exports (dollars) (2012)	**341,830,618**
Primary wood products	447,728
Pulp and paper products	231,770,911
Wood-fabricated materials	109,611,979
Value of imports (dollars) (2012)	**413,795,674**
Primary wood products	2,067,050
Pulp and paper products	265,717,421
Wood-fabricated materials	146,011,203

Ontario



Population (April 1, 2013) • 13,583,710

Eastern white pine

DOMESTIC ECONOMIC IMPACT	
Direct jobs (number) (2012)	
Labour Force Survey	55,600
Survey of Employment, Payrolls and Hours	38,159
Expenditures—capital (dollars) (2012)	**426,000,000**
Forestry and logging industry	39,600,000
Pulp and paper product manufacturing industry	262,700,000
Wood product manufacturing industry	123,700,000
Housing starts (2012)	**76,742**
Revenue from goods manufactured (dollars) (2011)	**10,865,987,000**
Forestry and logging industry	1,070,639,000
Pulp and paper product manufacturing industry	6,851,128,000
Wood product manufacturing industry	2,944,220,000
Wages and salaries (dollars) (2011)	**1,964,942,000**
Forestry and logging industry	166,688,000
Pulp and paper product manufacturing industry	1,149,268,000
Wood product manufacturing industry	648,986,000

FOREST MANAGEMENT	
Area defoliated by insects and containing beetle-killed trees (hectares) (2011)	562,225
Area planted (hectares) (2011)	33,162
Area seeded (hectares) (2011)	9,518
Fire—area burned (hectares) (2012)	146,653
Fires—number (2012)	1,507
Forest area certified (hectares) (2012)	24,153,505
Harvest area (hectares) (2011)	120,884
Harvest volume (cubic metres) (2011)	13,682,000

TRADE	
Balance of trade (total exports) (dollars) (2012)	-1,058,767,112
Value of domestic exports (dollars) (2012)	**3,462,304,229**
Primary wood products	32,613,276
Pulp and paper products	2,606,689,714
Wood-fabricated materials	823,001,239
Value of imports (dollars) (2012)	**4,644,386,064**
Primary wood products	43,681,769
Pulp and paper products	3,487,747,110
Wood-fabricated materials	1,112,957,185

Quebec

Population (April 1, 2013) • 8,099,095

Yellow birch

DOMESTIC ECONOMIC IMPACT	
Direct jobs (number) (2012)	
Labour Force Survey	76,500
Survey of Employment, Payrolls and Hours	60,906
Expenditures—capital (dollars) (2012)	**682,600,000**
Forestry and logging industry	30,900,000
Pulp and paper product manufacturing industry	455,700,000
Wood product manufacturing industry	196,000,000
Housing starts (2012)	**47,367**
Revenue from goods manufactured (dollars) (2011)	**16,128,888,000**
Forestry and logging industry	2,066,988,000
Pulp and paper product manufacturing industry	8,310,670,000
Wood product manufacturing industry	5,751,230,000
Wages and salaries (dollars) (2011)	**2,496,681,000**
Forestry and logging industry	329,561,000
Pulp and paper product manufacturing industry	1,100,253,000
Wood product manufacturing industry	1,066,867,000

FOREST MANAGEMENT	
Area defoliated by insects and containing beetle-killed trees (hectares) (2011)	1,545,350
Area planted (hectares) (2011)	82,517
Area seeded (hectares) (2011)	Not available
Fire—area burned (hectares) (2012)	70,076
Fires—number (2012)	773
Forest area certified (hectares) (2012)	30,426,353
Harvest area (hectares) (2011)	167,897
Harvest volume (cubic metres) (2011)	21,885,000

TRADE	
Balance of trade (total exports) (dollars) (2012)	5,032,959,376
Value of domestic exports (dollars) (2012)	**6,794,245,704**
Primary wood products	58,068,211
Pulp and paper products	5,083,402,044
Wood-fabricated materials	1,652,775,449
Value of imports (dollars) (2012)	**1,775,967,109**
Primary wood products	246,915,877
Pulp and paper products	1,050,548,770
Wood-fabricated materials	478,502,462

New Brunswick

Population (April 1, 2013) • 754,039

Balsam fir

DOMESTIC ECONOMIC IMPACT	
Direct jobs (number) (2012)	
Labour Force Survey	11,900
Survey of Employment, Payrolls and Hours	8,920
Expenditures—capital (dollars) (2012)	**Not available**
Forestry and logging industry	20,400,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	Not available
Housing starts (2012)	**3,299**
Revenue from goods manufactured (dollars) (2011)	**Not available**
Forestry and logging industry	437,400,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	891,038,000
Wages and salaries (dollars) (2011)	**Not available**
Forestry and logging industry	76,454,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	167,251,000

FOREST MANAGEMENT	
Area defoliated by insects and containing beetle-killed trees (hectares) (2011)	54,020
Area planted (hectares) (2011)	18,798
Area seeded (hectares) (2011)	Not available
Fire—area burned (hectares) (2012)	359
Fires—number (2012)	338
Forest area certified (hectares) (2012)	3,884,389
Harvest area (hectares) (2011)	59,330
Harvest volume (cubic metres) (2011)	9,231,000

TRADE	
Balance of trade (total exports) (dollars) (2012)	1,199,946,384
Value of domestic exports (dollars) (2012)	**1,418,374,150**
Primary wood products	31,313,432
Pulp and paper products	1,014,192,573
Wood-fabricated materials	372,868,145
Value of imports (dollars) (2012)	**218,472,604**
Primary wood products	68,002,627
Pulp and paper products	103,775,110
Wood-fabricated materials	46,694,867

Nova Scotia

Population (April 1, 2013) • 945,015

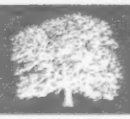
Red spruce

DOMESTIC ECONOMIC IMPACT	
Direct jobs (number) (2012)	
Labour Force Survey	5,400
Survey of Employment, Payrolls and Hours	Not available
Expenditures—capital (dollars) (2012)	**Not available**
Forestry and logging industry	12,900,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	Not available
Housing starts (2012)	**4,522**
Revenue from goods manufactured (dollars) (2011)	**Not available**
Forestry and logging industry	152,026,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	497,458,000
Wages and salaries (dollars) (2011)	**Not available**
Forestry and logging industry	34,972,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	98,290,000

FOREST MANAGEMENT	
Area defoliated by insects and containing beetle-killed trees (hectares) (2011)	Not available
Area planted (hectares) (2011)	9,564
Area seeded (hectares) (2011)	Not available
Fire—area burned (hectares) (2012)	818
Fires—number (2012)	344
Forest area certified (hectares) (2012)	1,316,087
Harvest area (hectares) (2011)	31,851
Harvest volume (cubic metres) (2011)	3,903,000

TRADE	
Balance of trade (total exports) (dollars) (2012)	338,864,531
Value of domestic exports (dollars) (2012)	**384,315,624**
Primary wood products	21,742,550
Pulp and paper products	290,380,134
Wood-fabricated materials	72,192,940
Value of imports (dollars) (2012)	**45,567,234**
Primary wood products	0
Pulp and paper products	15,982,762
Wood-fabricated materials	29,584,472

Prince Edward Island



Population (April 1, 2013) • 145,763

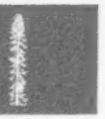
Red oak

DOMESTIC ECONOMIC IMPACT	
Direct jobs (number) (2012)	
Labour Force Survey	600
Survey of Employment, Payrolls and Hours	Not available
Expenditures—capital (dollars) (2012)	**Not available**
Forestry and logging industry	100,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	Not available
Housing starts (2012)	**941**
Revenue from goods manufactured (dollars) (2011)	**Not available**
Forestry and logging industry	Not available
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	10,965,000
Wages and salaries (dollars) (2011)	**Not available**
Forestry and logging industry	Not available
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	2,682,000

FOREST MANAGEMENT	
Area defoliated by insects and containing beetle-killed trees (hectares) (2011)	30
Area planted (hectares) (2011)	220
Area seeded (hectares) (2011)	Not available
Fire—area burned (hectares) (2012)	93
Fires—number (2012)	5
Forest area certified (hectares) (2012)	446
Harvest area (hectares) (2011)	2,871
Harvest volume (cubic metres) (2011)	389,000

TRADE	
Balance of trade (total exports) (dollars) (2012)	1,602,847
Value of domestic exports (dollars) (2012)	**1,618,837**
Primary wood products	9,750
Pulp and paper products	1,392,806
Wood-fabricated materials	216,281
Value of imports (dollars) (2012)	**20,312**
Primary wood products	0
Pulp and paper products	0
Wood-fabricated materials	20,312

Newfoundland and Labrador



Population (April 1, 2013) • 513,568

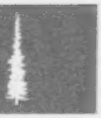
Black spruce

DOMESTIC ECONOMIC IMPACT	
Direct jobs (number) (2012)	
Labour Force Survey	1,900
Survey of Employment, Payrolls and Hours	Not available
Expenditures—capital (dollars) (2012)	**Not available**
Forestry and logging industry	1,100,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	Not available
Housing starts (2012)	**3,885**
Revenue from goods manufactured (dollars) (2011)	**Not available**
Forestry and logging industry	57,005,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	57,351,000
Wages and salaries (dollars) (2011)	**Not available**
Forestry and logging industry	17,448,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	12,170,000

FOREST MANAGEMENT	
Area defoliated by insects and containing beetle-killed trees (hectares) (2011)	75,824
Area planted (hectares) (2011)	5,129
Area seeded (hectares) (2011)	Not available
Fire—area burned (hectares) (2012)	137,468
Fires—number (2012)	192
Forest area certified (hectares) (2012)	1,493,405
Harvest area (hectares) (2011)	17,069
Harvest volume (cubic metres) (2011)	1,344,000

TRADE	
Balance of trade (total exports) (dollars) (2012)	112,078,190
Value of domestic exports (dollars) (2012)	**118,069,607**
Primary wood products	3,500
Pulp and paper products	114,323,113
Wood-fabricated materials	3,742,994
Value of imports (dollars) (2012)	**5,997,360**
Primary wood products	19,967
Pulp and paper products	5,711,101
Wood-fabricated materials	266,292

Yukon



Population (April 1, 2013) • 36,418

Subalpine fir

FOREST MANAGEMENT	
Area defoliated by insects and containing beetle-killed trees (hectares) (2011)	55,105
Area planted (hectares) (2011)	Not available
Area seeded (hectares) (2011)	35
Fire—area burned (hectares) (2012)	92,115
Fires—number (2012)	126
Forest area certified (hectares) (2012)	Not available
Harvest area (hectares) (2011)	300
Harvest volume (cubic metres) (2011)	27,000

TRADE	
Balance of trade (total exports) (dollars) (2012)	77,541
Value of domestic exports (dollars) (2012)	**129,039**
Primary wood products	0
Pulp and paper products	0
Wood-fabricated materials	129,039
Value of imports (dollars) (2012)	**57,677**
Primary wood products	750
Pulp and paper products	50,264
Wood-fabricated materials	6,663

Northwest Territories

Population (April 1, 2013) • 43,349

Tamarack

DOMESTIC ECONOMIC IMPACT	
Expenditures—capital (dollars) (2012)	**Not available**
Forestry and logging industry	Not available
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	Not available

FOREST MANAGEMENT	
Area defoliated by insects and containing beetle-killed trees (hectares) (2011)	56,205
Area planted (hectares) (2011)	27
Area seeded (hectares) (2011)	Not available
Fire—area burned (hectares) (2012)	294,034
Fires—number (2012)	273
Forest area certified (hectares) (2012)	Not available
Harvest area (hectares) (2011)	60
Harvest volume (cubic metres) (2011)	28,000

TRADE	
Balance of trade (total exports) (dollars) (2012)	128,170
Value of domestic exports (dollars) (2012)	**128,170**
Primary wood products	0
Pulp and paper products	7,200
Wood-fabricated materials	120,970
Value of imports (dollars) (2012)	**0**
Primary wood products	0
Pulp and paper products	0
Wood-fabricated materials	0

Nunavut

Population (April 1, 2013) • 34,023

TRADE	
Balance of trade (total exports) (dollars) (2012)	68,050
Value of domestic exports (dollars) (2012)	**67,915**
Primary wood products	0
Pulp and paper products	67,915
Wood-fabricated materials	0
Value of imports (dollars) (2012)	**0**
Primary wood products	0
Pulp and paper products	0
Wood-fabricated materials	0

Source and information

The statistical profile data in the preceding tables are derived from a number of sources, which are identified here under each data type. Where necessary, they have been edited for accuracy and consistency. All data are subject to revision.

In most cases, the data represent the year before the reporting period. However, when they are gathered from several sources, it takes longer to analyze and produce them. In these cases, the numbers reflect results from two or three years before the reporting period.

While most of the figures are calculated for the calendar year, some are based on the federal government's fiscal year (April 1 to March 31). Numbers are rounded off. In the case of employment data, they are rounded to the nearest hundred.

It may not be possible to compare directly the data from the various sections, as they come from several sources that may compile their statistics differently from each other.

Arboreal emblems

The tree species designated or officially adopted as the arboreal emblem of Canada and of each province and territory is shown in the profiles. Nunavut does not have an arboreal emblem.

Domestic economic impact

Canadian housing starts—seasonally adjusted annual rate (SAAR)

– A rate adjustment used for economic or business data that attempts to remove seasonal variations in the data.

The time of year will affect most data. Adjusting for the seasonality in data enables more accurate month-to-month comparisons. The SAAR is calculated by dividing the unadjusted annual rate for the month by its seasonality factor and creating an adjusted annual rate for the month. These adjustments are often used when economic data are released to the public.

Source: Statistics Canada, Canada Mortgage and Housing Corporation, housing starts, under construction and completions, all areas, annual (units), CANSIM Table 027-0009

Contribution to gross domestic product (GDP)

– A measure of the economic production that takes place within the geographical boundaries of Canada. The term "gross" means that capital consumption costs—costs associated with the depreciation of capital assets (buildings, machinery and equipment)—are included.

Figures are in current dollars and are available only for Canada. Current dollars are used to determine the actual GDP without taking into account variable factors such as inflation.

Sources: 2008–2009: Statistics Canada, GDP at basic prices in current dollars, by North American Industry Classification System, seasonally adjusted at annual rates, CANSIM Table 379-0029

2010–2012: Natural Resources Canada (NRCan), calculations using Statistics Canada, GDP in 2007 constant prices, NRCan estimated industry price deflators, CANSIM Table 379-0031

Direct jobs

– Jobs held by people employed directly in forestry and logging, and in industries involved in support activities for forestry, pulp and paper product manufacturing and wood product manufacturing.

The data are sourced from Statistics Canada's Labour Force Survey (LFS) and the Survey of Employment, Payrolls and Hours (SEPH). The LFS data are used to capture the level of self-employment in the forest sector. The SEPH data are to be used for comparing direct employment in forestry with that in other sectors.

Source: Statistics Canada, Labour Force Survey, March 2013 (special extraction) and the Survey of Employment, Payrolls and Hours, unadjusted for seasonal variation, by type of employee for selected industries classified using the North American Industry Classification System, monthly (persons), CANSIM Table 281-0023, March 2013

Expenditures—capital and repair

– Capital expenditures: Include the costs of procuring, constructing and installing or leasing new durable plants, machinery and equipment, whether for the replacement of or addition to existing assets. Also included are all capitalized costs, such as the costs for feasibility studies and architectural, legal, installation and engineering fees; the value of capital assets put in place by firms either by contract or with the firm's own labour force; and capitalized interest charges on loans for capital projects.

– Repair expenditures: Include costs to repair and maintain structures, machinery and equipment.

Source: Statistics Canada, capital and repair expenditures, by sector and province, annual (dollars), CANSIM Table 029-0005, and capital and repair expenditures, industry sectors 31–33, manufacturing, annual (dollars), CANSIM Table 029-0009, March 2013

Revenue from goods manufactured

– Revenue from the sale of goods manufactured using materials owned by the establishment, as well as from repair work, manufacturing service charges and work contracted to others.

Source: Statistics Canada, Annual Survey of Manufactures and Logging: logging industries, principal statistics by North American Industry Classification System, annual, CANSIM Table 301-0007, and principal statistics for manufacturing industries, by North American Industry Classification System, annual, CANSIM Table 301-0006, March 2013

Wages and salaries

– The earnings, in cash or in kind, of Canadian residents for work performed before deduction of income taxes and contributions to pension funds, employment insurance and other social insurance schemes.

Source: Statistics Canada, Annual Survey of Manufactures and Logging: logging industries, principal statistics by North American Industry Classification System, annual, CANSIM Table 301-0007, and principal statistics for manufacturing industries, by North American Industry Classification System, annual, CANSIM Table 301-0006, March 2013

Forest management

Area defoliated by insects and containing beetle-killed trees

– Areas where there is tree mortality and moderate to severe defoliation.

Defoliation does not always imply mortality. For example, stands with moderate defoliation often recover and may not lose much growth. Also, defoliation is mapped on an insect species basis, and a given area may be afflicted by more than one species at a time. This may result in double

or triple counting in areas affected by more than one species, exaggerating the extent of the total area defoliated.

Source: National Forestry Database

Area planted and seeded

– Total of federal, private and provincial Crown land.

Source: National Forestry Database

Carbon emissions/removals

– For forest lands affected by land-use change, the deforestation and afforestation figures reflect annual rates. Figures for CO_2-equivalent (CO_2e) emissions and removals reflect the current year plus the previous 20 years. Thus, the figures for CO_2e emissions include residual emissions from areas deforested over the past 20 years; and the figures for CO_2e removals include ongoing removals by areas afforested over the past 20 years.

Emissions and removals exactly match the most recent greenhouse gas inventory figures submitted to the United Nations Framework Convention on Climate Change. Emissions bear a positive sign. Removals bear a negative sign.

Source: Environment Canada, National Inventory Report 2013 (based on Natural Resources Canada–Canadian Forest Service National Forest Carbon Monitoring, Accounting and Report System data/analysis)

Fire

– All burned areas within Canada's forests.

Sources: All figures for the most current year are from the Canadian Interagency Forest Fire Centre. Data for all previous years were provided by the provinces and territories and are available from the National Forestry Database.

Forest area certified

– If a forest area has been certified to more than one of the three sustainable forest management standards (Canadian Standards Association [CSA], Sustainable Forestry Initiative [SFI] and Forest Stewardship Council [FSC]), the area is counted only once. Hence, the total certifications for sustainable forest management standards may be less than the sum of the individual totals for these standards.

Source: Canadian Sustainable Forestry Certification Coalition

Harvest (volume)

– The national and provincial/territorial figures for harvesting volume include data for industrial roundwood, fuelwood and firewood.

Source: National Forestry Database

Forest products

Domestic consumption

– Consumption figures for a range of products, calculated by Natural Resources Canada–Canadian Forest Service.

This information is available only at the national level.

Production

Christmas trees

The production quantity and value are based on estimates calculated by Natural Resources Canada–Canadian Forest Service.

Sources: Statistics Canada and National Forestry Database

Lumber

Source: Statistics Canada, lumber production, shipments and stocks, monthly (cubic metres x 1,000), CANSIM Table 303-0064, April 2013

Maple products

Source: National Forestry Database

Newsprint, printing and writing paper, wood pulp

The production and consumption figures are based on Pulp and Paper Products Council data.

Structural panels

The production and consumption data for structural panels (plywood and oriented strandboard) are from the APA – The Engineered Wood Association.

Inventory

Area classification

– A number of improvements have been made to the National Forest Inventory data compilation and statistical estimation procedures since the original baseline reports were produced. Because of these improvements, there are some minor changes to the data previously reported. The result is that area of forest, other wooded land and other land with tree cover reported this year is 396.9 million ha, a 362,000-ha reduction from the figure reported in 2012 (397.3 million ha).

Source: National Forest Inventory, updated 2006 baseline

The National Forest Inventory uses the following definitions of the Food and Agriculture Organization of the United Nations (FAO):

- Forest land
  Areas of land where tree canopies cover more than 10% of the total area and the trees, when mature, can grow to a height of more than 5 metres. Does not include land that is predominantly urban or used for agricultural purposes.

- Other land with tree cover
  Areas of land where tree canopies cover more than 10% of the total area and the trees, when mature, can grow to a height of at least 5 metres. Includes treed areas on farms, in parks and gardens, and around buildings. Also includes tree plantations established mainly for purposes other than wood production, such as fruit orchards.

- Other wooded land
  Areas of land where: 1) tree canopies cover 5–10% of the total area and the trees, when mature, can grow to a height above 5 metres; or 2) shrubs, bushes and trees together cover more than 10% of the area. These areas include treed wetlands (swamps) and land with slow-growing and scattered trees. They do not include land that is predominantly agricultural or urban.

Forest type

Source: National Forest Inventory, updated 2006 baseline

Ownership

An important change in the data is that the federal ownership has decreased while the territorial ownership has increased as a result of devolution.

Source: National Forest Inventory, updated 2006 baseline

Trade

Balance of trade

– The difference between the value of the goods and services that a country exports and the value of the goods and services that it imports.

If a country's exports exceed its imports, it has a trade surplus. If imports exceed exports, the country has a trade deficit.

Source: Statistics Canada, merchandise trade data (special extraction), monthly data

About the Canadian Forest Service

The Canadian Forest Service (CFS) is part of Natural Resources Canada, a federal government department.

Natural Resources Canada helps integrate and shape the major contributions that the country's natural resource sectors make to the economy, society and the environment. One of those sectors is forestry. Forests touch every Canadian's daily life in some way and contribute significantly to the nation's prosperity overall.

The CFS is the national and international voice for the Canadian forest sector. The organization provides science and policy expertise and advice on national forest sector issues, working in close collaboration with the provinces and territories.

Building on more than a century of experience, CFS scientists, technicians, economists, policy analysts and other dedicated professionals conduct research, carry out economic analyses and provide policy and program leadership on a wide range of matters related to Canada's forests and forest sector.

Today, a primary focus of the CFS is pursuing its vision of a robust, globally competitive forest sector firmly underpinned by healthy, productive and sustainable forests. Achieving this vision is critical to ensuring the long-term economic success of the sector and the sustainable management of this important renewable resource.

Key to the success of this work is collaboration, innovation and knowledge dissemination.

Strategic priorities set by the CFS to achieve its vision:

Support forest sector competitiveness

Facilitate the transformation of Canada's forest sector by supporting the development of new forest products, fostering a culture of innovation, and opening a diverse range of international markets.

Optimize forest value

Improve the well-being of Canadians by making the most of the wide range of benefits that sustainable forests bring to industry, communities and Canadians.

Advance environmental leadership

Advance the environmental performance of Canada's forest sector and the sustainable development of forests by providing ecosystem science and information.

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